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Flows of Information/Influence and Diversity of Content within Online Public Fora in the Context of Civil Society

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Dedication

To my parents and my family, especially Juwon,

for their love, patience, and support.

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Flows of Information/Influence and Diversity of Content within Online Public Fora in the Context of Civil Society

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Online public fora based on social media facilitate social interaction and synchronous online discussion. Social-media-based public fora resemble real-life political talks, and induce a larger number of and a wider variety of participants than blogs or Usenet newsgroups. By investigating two online groups centered on political discussions on Twitter, this study explores how information and influence flow, how diverse the actual discourse is, and to what extent the online groups communicate with the government.

Using network analysis and content analysis/co-word analysis, this study has the findings as follows: In terms of the structural qualities, online public fora are relatively inclusive, but are centralized on a few participants and do not have a statistically significant indication of being equitable in discussion. The two-step flow of communication operates along with the presence of opinion leaders who turn out to be influentials but not content creators. Interestingly, the flow of influence is likely to be less centralized than the flow of information, which implies the importance of the reliability

of a given message rather than that of the author. In terms of the actual discourse, participants turn to like-minded fellow citizens' remarks. Discourses are more emotional than cognitive and exhibits more anger than anxiety. Influential discourses are those with negative emotion more so than with positive emotion and those that are cognitive rather than emotional. Among cognitive components, assertive and strong discourses have greater social influence than analytical discourses. In terms of the interaction with the e-government outlet, the distance between public authorities and private citizens is continuously present despite the decline of temporal and physical distance via the Internet.

Based on the results, this study suggests a reconsideration of the Habermasian public sphere in online public fora. It contributes to the literature by empirically confirming the presence of the two-step flow of communication in online public fora and testing the difference between the flow of information and the flow of influence. In addition, it broadens the realm of research on political communication by exploring not only sources/ideological perspectives but also emotional/cognitive aspects in discussions. Methodologically, structure/context, multi-level, and quantitative/qualitative analyses allow this study to have a comprehensive account of online public fora. Practically, this study proposes to improve the interactivity with citizens as the next stage of e-government development.

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Chapter 1: Introduction

WHY ONLINE PUBLIC FORA?

Media play a critical role in the process of democracy. They are presumed to provide a wide range of perspectives and opinions to a mass public which has limited resources to gather information and share opinions. Normatively, mass media offer diverse viewpoints, help people to make informed political decisions, and contribute to forming public opinions (Baker, 1997; Benkler, 2006). Through properly functioning media, an informed citizenry can be nurtured, increase civic engagement, and ultimately lead to a better democratic society. However, some have argued that the contemporary mass media in fact have represented a limited intake of opinions (Benkler, 2006) and have been overly susceptible to advertisers' influence (Baker, 1997). The public have not been allowed to have full speech rights in both broadcast and print media (Stein, 2006). The Frankfurt School's broader argument that mass media reduced the public to consumers and failed to provide the public a public sphere to express and share opinions has had a growing chorus of agreement from various critics (Habermas, 1989).

These limitations of conventional mass media for social mediation might or might not be complemented by various services on the Internet which have emerged as a new venue to discuss politics (Castells, 2007). In the 2011 report of the State of the News Media (Pew Research Center's Project for Excellence in Journalism, 2011), it was only online news that gained more readers compared to the previous year, while all other media such as network/local/cable televisions, newspapers, and magazines kept losing

their audiences. Among social network sites' (hereafter SNSs) users who also go online to seek for news, 51% obtained news items from people whom they "follow" (Purcell, Rainie, Mitchell, Rosenstiel, & Olmstead, 2010). According to the Pew Internet and American Life Project (Smith, 2009), 74% of Internet users, i.e. over the half of entire adult population in the U.S., went online to both communicate about politics as well as to obtain news during the 2008 election. As noted in the above survey results, the Internet has become more and more influential in the flow of political information in our daily life (Bucy & Gregson, 2001; Neuman, Bimber, & Hindman, 2011). This growing reliance on the Internet for information gathering and political discourse was described as "(C)ivil society is moving to the Internet" (Levine, 2004, p.79). The Internet has drawn attention as a "new, all-inclusive forum for deliberation, information gathering, and exchanges among citizens" (Hardy & Scheufele, 2005, p.73).

Along with the growing use of the Internet for political purposes, the question of whether the Internet functions as a public sphere where public opinions rise through the exchange of information and discussions or simply a public space where anybody can rant and rave remains to be answered. As for the democratic potential of the Internet use, previous studies have had complicated answers: Online political discussions, not online information seeking itself, were found to be an important moderator to enhance political involvement; Not only selective exposure to like-minded opinions but also inadvertent exposure to cross-cutting ideologies seem to exist concurrently in the new media environment. In addition, studies that directly compare online public fora to Habermas's public sphere had a common conclusion that online public fora do not constitute a public

sphere, whereas some studies see the potential of online public fora as a new, networked public sphere. These mixed possibilities of online public fora in functioning as a public sphere as well as the importance of a public sphere in the practice of democracy motivated the present study to examine the structural quality and content of online political discussions.

In the present study, online public fora are defined as a place for sharing information and discussion about certain topics (Choi & Park, forthcoming). Compared to face-to-face meetings, it lessens temporal, spatial, and cost barriers and consequently promotes participation in the forum. The earlier online fora were in the forms of bulletin board system, electronic mailing lists (Listserv), community network on Freenet, and Newsgroups on Usenet, which enabled users to post messages in public message boards and exchange e-mails with other users. Later on, online public fora became more synchronous and interactive based on social media such as Facebook and Twitter.

PURPOSE, SIGNIFICANCE, AND SCOPE OF THE STUDY

This study examines the structure of political discussion networks, the flows of information and influence, and the content of political discussions, using both network analysis and content analysis. Specifically, the difference between the flow of information and the flow of influence, the characteristics of opinion leaders, the forms (emotional/cognitive), sources, and ideological perspectives of content, and the extent to which online communities share conversations with the government are explored. By

empirically examining both the structure and content of the online public fora in the public sphere context, we can characterize how well the Internet is able to contribute to meaningful political discourse.

Five aspects distinguish this study from previous studies on online political discussion. First, it focuses on political discussions taken place on SNSs. Currently, few studies have been done on SNSs in the political communication context. Most are based on overall Internet use such as searching for information, reading articles, and discussing politics. Some address specific platforms such as blogs and Usenet, but, these are neither synchronous nor accessible as much as SNSs are: Blogs and Usenet are geared to posting comments rather than synchronous social interaction, and they have a limited number of participants, compared to SNSs (Gaines & Mondak, 2009). SNSs facilitate civic interaction and discussions about politics which can be an important route toward further political participation. Second, this study explores the actual discourse to which participants are exposed. Previous studies have been based on survey results which rely on respondents' recollection of prior experiences or perceptions of online chatting. It was rarely the content but mostly the contact or perception of content that they measured. Third, the actual discourse's emotional and cognitive components are investigated. While the recent literature in political communication has paid attention to emotions such as anxiety and anger, not much has been done in regards to cognitive aspects such as causation and assertion. By investigating both aspects, the expressive or rational qualities of discourse can be discovered. Fourth, the interaction between online public fora and the government is explored, which has been under-examined in political communication

research. Previous studies mostly focused on the discursive dimension of the public sphere, specifically whether the discussion is deliberative or not. However, since the public sphere should catalyze public opinions and inform the government of these opinions, the relationship with the government is an important facet of a public sphere. Lastly, both structure and content of the discussion network are investigated in this study, whereas most studies addressed only one of the two. Studies that focus on the structure examine structural qualities such as degree distributions and network size, and those that conduct content analysis explore issues such as users' intentions, emotional reactions, and content sources. Exploring both, we can have a better understanding of the online public fora and the overall dynamics of information flow without sacrificing the granularity of content. The present study contributes to the literature by exploring the actual, political discussions of online communities based on Twitter, one of the popular SNSs, and people's interactions with e-government outlets, based on both network analysis and content analysis.

This study purposely uses the term "discussion," instead of other somewhat similar terms such as "conversation" and "debate." Key differences among the three are whether verbal communication is issue-oriented or not, whether it is private or non-private, and whether it is formal or informal. Since the online communities investigated here have detailed conversations centered on politics, they are more public than ordinary "conversation" and less formal than most "debates;" therefore this study uses the word "discussion" to describe the communicative behavior in certain online communities.

As for the scope of this study, discussions such as the digital divide in terms of technological access, commercialization of the online space, information filtering by a few search engines, and demographic attributes of online participants (Dahlberg, 2001; Hindman, 2009; Papacharissi, 2002) are not considered, since the analyses of the present study are focused on online groups and the flows of information and influence within those groups. Additionally, the term "online" in this study is not intended to make a distinction from "offline (or real)" but to indicate one form of communication mediated by technology. The dichotomized separation between online and offline is likely to reify online activities into another world, rather than regarding them as a continuum of our everyday life (Bakardjieva, 2003). Instead of drawing the line between online and offline realms, which more critics concede does not exist, this study regards online discussion as one form of technology-mediated communication. By focusing on online discussions, political conversations shared in the face-to-face context are not addressed, restricting the interpretation of research results to computer-mediated communication. However, this limitation does not undermine the significance of the present research, since online political discussion has been found to be a stronger predictor of both online and offline political participation than face-to-face political conversation (see Cho et al., 2009; Price, 2009; Shah, Cho, Eveland, and Kwak, 2005).

Previous studies found a positive association among online information seeking, online political discussion, and political participation[1]: The more one seeks information

[1] Political participation here includes such activities as voting, writing letter to the governor, attending election campaign, circulating a petition, and contributing money.

online and participates in political discussion online, the more one participates in political activities. Within this big picture of the known relationship among online information use, online political discussion, and political participation, the present study examines online political discussion based on social media and explores the flows of information and influence, opinion leadership, and the interaction with e-government outlets. In addition, this study examines the actual discourse shared in online public fora in terms of sources, ideological perspectives, and the forms of discourse (emotional/cognitive), an inquiry inspired by the cognitive dissonance theory and affective intelligence theory. The findings are discussed in the context of civil society in relation to Habermas's public sphere theory.

In the next chapter, the theoretical foundation of the present study is introduced through a literature review examining the relationship between civil society and the Internet. It also explains the unique opportunities that social media provide for this research to explore online public fora, whereas many previous studies examined the general use of the Internet or the bulletin-board style postings of Usenet and blogs. In addition, it discusses the notion of the public sphere and formulates research questions and hypotheses related to the constituents of the public sphere. Chapter 3 illustrates the research setting, case selection, methods, and specific analysis plan, including research questions and hypotheses. In Chapter 4, research results are explained in three sections: network, content, and interaction with the e-government outlet. Based on these results, discussion on rethinking the Habermasian notion of the public sphere in online public fora is provided in Chapter 5. Chapter 5 also includes theoretical, methodological, and

practical implications as well as limitations and suggestions for future research, followed by the conclusion.

Chapter 2: Literature Review

CIVIL SOCIETY AND THE INTERNET

Many studies have discussed the impact of Internet use on our society in the context of democratic processes. Among the main questions in the literature are whether the new media environment contributes to increasing political participation and whether it increases the selective exposure to similar ideologies, the so-called "echo chamber effect." The current chapter first explores the literature in regards to the behavioral aspect of Internet use, such as how people seek political information and discuss politics, and the effect of these behaviors on political involvement. It also illustrates that previous studies have uncovered the phenomenon of selective exposure to congenial content as well as inadvertent exposure to conflicting opinions on the Internet. This literature review on behavioral and content-wise aspects prompts the discussions in next sections on how new research can fill gaps in the literature and make a contribution to our understanding of online public fora.

Several studies have examined how the behavior of seeking information or discussing political issues on the Internet affects political participation. By comparing mass media use to the Internet use, Shah et al. (2005) found that online information seeking and online messaging had a greater effect on civic engagement, rather than mass media use for informational purposes. This tendency was also confirmed in Kenski and Stroud (2006) who found positive relationships between online exposure to campaign information and political efficacy/knowledge/participation. A meta-analysis on 38

relevant articles produced during the period of 1998 to 2007 (Boulianne, 2009) also found that the literature demonstrates a positive effect of Internet use on political engagement, a tendency also confirmed by other more recent studies (see Gil De Zuniga, Puig-I-Abril, & Rojas, 2009; Kushin & Yamamoto, 2008).

In addition to online information seeking as a predictor of political participation, online political discussions were found to be a significant factor moderating the relationship between online information seeking and political participation (Hardy & Scheufele, 2005). Two panel studies of political discussion groups (Price, 2009) also demonstrated that online participants turned out to have significantly higher social trust, civic engagement, and political participation, compared to non-participants. Seeing the importance of political discussion, Cho et al. (2009) theorized that interactive political messaging as a process of 'reasoning' could be a bridge between the 'stimuli' of news use and the 'response' through democratic outcomes. They found that online messaging had a greater explanatory power in predicting political participation than offline political discussion. These studies all controlled predispositions of individuals such as political interest and participation by including them as control variables or performing panel studies, in order to reject the possibility of reverse causality that people politically active engage in online discussions rather than online discussions increase political participation. Similar findings were reported with respect to China in Yang's (2003) analysis; with a nascent civil society in China[2], online debates helped to better inform citizens, articulate

[2] Despite the digital inequality and censorship in China, the gap between information haves and have-nots is declining, and Internet users have developed their own strategies to circumvent censorship by employing peer-to-peer strategies (Qiu, 2004).

social problems, and increase the chance of political actions. These results suggest that neither the online information seeking itself (Scheufele & Nisbet, 2002) nor the frequency of Internet use (Jennings & Zeitner, 2003), but *online interaction* with fellow citizens contributes more to increases in political involvement. This conclusion is in line with the literature that has found interpersonal discussion to be an important factor for political engagement (McLeod, Scheufele, & Moy, 1999).

The relationship between political discussion and political engagement tends to create a positive feedback loop. According to the cognitive mediation model (Eveland, 2001), those seeking surveillance gratification pay more attention to news and are likely to undergo elaborative processing of the news, and consequently end up with more political knowledge. This elaboration which means linking new information to one's memory can be facilitated by discussions with others. The citizen communication mediation model (Shah et al., 2005) further specifies the mediation of online and offline discussions among citizens between news consumption and political participation. Embracing the above two models, Cho et al. (2009) proposes the O-S-R-O-R model by adding the first R to the earlier O-S-O-R model. The first O stands for the reception situation of audiences such as structural, cultural, motivational, and cognitive status, and S represents stimuli such as exposure to news. R denotes reasoning process such as mental elaboration and discussions on the stimuli, O means outcome orientations, and the last R signifies responses or outcomes such as political knowledge and participation (Cho et al., 2009). Considering elaboration processing addressed in the cognitive mediation model and political discussions included in the citizen communication mediation model,

Cho et al. found that news use and political knowledge/participation are mediated by reasoning and online/offline political discussions. This line of research illuminates the importance of discussion about politics in both online and offline settings. In particular, online political discussions were found to be a stronger predictor of political participation than offline political discussions.

While joining online discussions tends to increase political participation, it does not necessarily lead one to encounter diverse opinions or content. Adamic and Glance (2005) observed a divided blogosphere between liberal and conservative bloggers and rarely found cross-links between blogs of the two camps. Hargittai, Gallo, and Kane (2007) also supported this tendency, although concomitantly patterns of linking like-minded others' blogs did not increase over time. In Stroud (2008), a cross-sectional analysis and a panel analysis on the relationship between ideology and political Internet use found that people are highly likely to visit websites that match their own political predisposition. These findings prompt us to consider Sunstein's formulation (2007): he argues that the balkanization of opinions has been promoted by the Internet which facilitates opportunities to filter content. In his view, online fora are nothing more than echo chambers of like-minded people, as also argued by Wilhelm (1998).

However, unlike the former findings, Kelly, Fisher, and Smith (2006), analyzing the political discussion groups of the Usenet found many interconnections between groups with different political orientations. Based on a survey of users of online chat rooms or discussion boards, Wojcieszak and Mutz (2009) found that cross-cutting discourse on political issues took place in nonpolitical online groups more frequently than

in political online groups. This "inadvertency" of exposure to different political views in online settings has been supported by a series of recent studies (Brundidge, 2010a; Kim, 2011). Brundidge (2010a) in particular found that online political discussion increased the exposure to political heterogeneity through a survey encompassing both Internet users and non-users. Marginalized groups, often silent in broader political discussion, are expressing their voices and empowering themselves using the Internet, as depicted by Mehra, Merkel, and Peterson Bishop (2004).

From a psychological perspective, the selective exposure phenomenon stems from the drive to reduce cognitive dissonance by avoiding information that conflicts with one's committed position and that is difficult to refute (Festinger, 1964). This behavior leads people to be engaged in biased information seeking to maintain cognitive stability (Jonas, Schulz-Hardt, & Frey, 2005). Later, selective exposure to supporting information was found to be not equivalent to selective avoidance of challenging information (Garrett, 2009), which reconciles the seemingly contrasting arguments between selective exposure and "inadvertent encounter" hypotheses. People favor and selectively choose congenial content, but do not intentionally avoid and sometimes do encounter conflicting content. This is why selective exposure to like-minded content is more prevalent than selective avoidance to challenging content. A different explanation is given by the affective intelligence theory which explains that the selective exposure phenomenon is contingent upon emotions (Marcus, MacKuen, & Neuman, 2011): Anxiety was positively associated with seeking challenging information and willingness to compromise, whereas aversion or anger was negatively correlated with both (MacKuen, Wolak, Keele, & Marcus, 2010).

If a person is angry about a certain issue, he or she tends to search for like-minded opinions, whereas when anxious, one tends to learn more about a given issue and be more open to conflicting information.

Taken together, the studies discussed above agree that the Internet provides a place for political discussions, irrespective of their approaches and methods. However, how online public fora contribute to democracy seems to have complicated answers, which could be summarized as follows: From the behavioral aspect, online political discussions with fellow citizens contribute to increasing political engagement; however, simply going online and finding political information does not necessarily mean that one is more politically engaged. From the content-wise aspect, the new media environment might facilitate selective exposure to like-minded ideas, but it also could facilitate unintended encounters with heterogeneous opinions, which is affected by cognitive and emotional processes.

Based on the review of the relevant literature, the theoretical framework of the present research is depicted in Figure 1. Given the previous findings of the relationship among 'online information seeking,' 'online political discussion,' and 'political participation,' this study situates in 'online political discussion' by investigating discussions in social-media-based public fora which might increase political participation and also examines their interaction with the government which might be attributable to online political discussion. In addition, this study explores the content of the discussion considering both cognitive and emotional processes in regards to the selective exposure phenomenon.

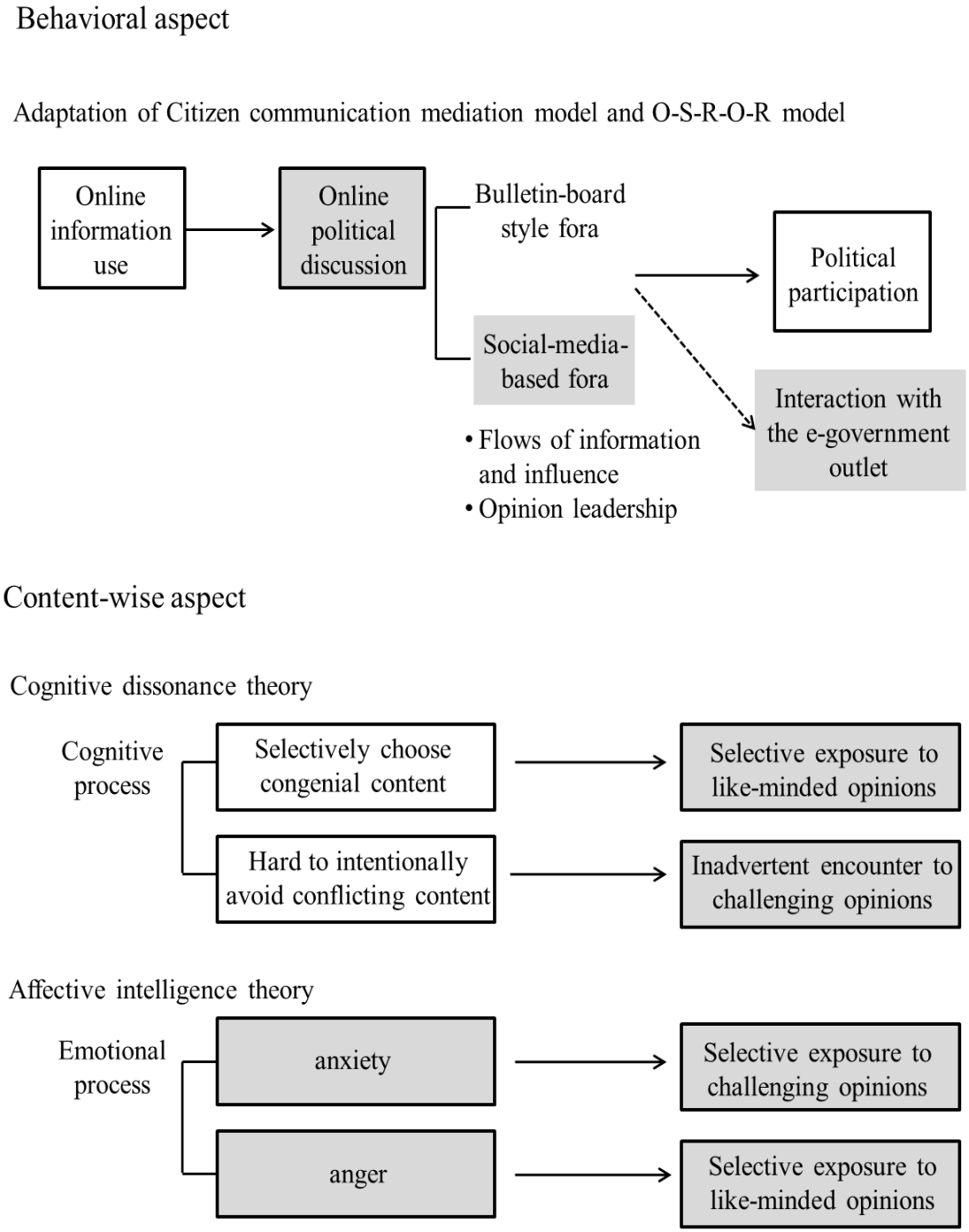

Figure 1: Theoretical Framework of the Research

Note: Gray squares denote the areas that the present study investigates. The dotted line is not a tested relationship in previous studies.

SOCIAL MEDIA FOR POLITICAL DISCUSSION

On top of the previous findings, this research brings social media into the literature of political communication. Observing that SNSs are permeating our daily political engagement in terms of sharing information and discussing politics, the present study attempts to enrich the literature by examining online groups in social network settings as they engage in political discussions. This chapter explains the function of social media in the context of civil society.

Considering the importance of online political discussions as an enhancer for political participation, SNSs, where more participation and lively discussions might take place than on blogs or online bulletin boards, could be an important venue for further investigation in the context of civil society (Mutz & Young, 2011). Studies that examined SNSs in their early years focused on the debate of social capital, online social support, and privacy (boyd & Ellison, 2007). The political impact of SNSs has been featured in online activism or social movement literature (McCaughey & Ayer, 2003), but not in the political communication context. At present, a few studies (see Gil de Zuniga, 2012; Halpern & Lee, 2011; Johnson, Zhang, Bichard, & Seltzer, 2010) have explored the influence of SNSs in regards to political communication. While much political communication research has addressed the role of overall Internet use, types of typical online behaviors, or postings on specific platforms such as Usenet and blogs, SNSs provide unique research opportunities that were not available before.

First, Usenet and blogs are platforms for "asynchronous threaded, bulletin-board style discussion," whereas SNSs are a platform for "synchronous online discussion" which better facilitates social interaction and conversation (Neuman et al., 2011, p.34). Second, compared to Usenet and blogs, a larger number of and a wider variety of participants join SNSs (Gaines & Mondak, 2009). Third, unlike many political blogs that are invisible and left unread except for a few A-list bloggers' postings, political discussion in SNSs is less subject to this problem since it is based in social networks, an additional layer of relationship. Fourth, given that politics are discussed with those in one's social network, they resemble something more like real-life political talks, compared to other platforms. Fifth, SNSs allow the researcher to have samples not limited to college students, on which many previous studies relied (Gil de Zuniga, 2012).

From a content-wise aspect, another advantage of exploring political discussion in SNSs is that the 'actual' content discussed among participants can be investigated, rather than 'perceived' content recollected by survey respondents. Studies related to selective exposure to like-minded content have not actually measured 'content' shared in real discussions, but rather relied on respondents' memories of content shared or 'contact' with others: How frequently do you discuss politics with people who have extreme right or left views, who are Democrats or Republicans, and who have different races or ethnicities (Brundidge, 2010a) ? As illustrated, studies depended on reports of the perceptions on past experiences or those with whom people were having political discussions to serve as a proxy for which content people shared. However, online

communication on social media allows the researcher to directly tackle the discourse and examine the diversity of content shared in a real context.

Among SNSs, this study chose Twitter for the following reasons. Twitter has been regarded as primarily public and available for users to read interested or relevant content (Marwick & boyd, 2010) without barriers to sign in or requests for being "friends." It is a realm where interpersonal communication and mass communication integrate. Twitter also facilitates anytime-anywhere connection through its application for mobile devices (Lee, Cha, & Park, 2010; Parmelee & Bichard, 2011). The 140-character-limit of Twitter appears not to be detrimental to discussions, since this short posting tends to promote fast responsiveness and facilitates conversations, especially inasmuch as Twitter is available on multiple devices. Moreover, Twitter users can post long Tweet messages without any word limits via Twitlonger.com. Other communicative functions such as "intertextuality," "transmediality," and "intermediality" help to have political discussions on Twitter (Caja, Mark, & Einspänner, 2012): The @ sign allows for maintaining coherence among Tweets (intertextuality), as confirmed by Honeycutt and Herring (2009); hyperlinks embedded in Tweets help traverse to other media (transmediality or traversability (Brundidge, 2010b)), and audio-visual aids enhance effective communication (intermediality). While some of these features are shared with other SNSs, Twitter is more public, more open, and more accessible, all of which are conducive to public discussions, and it appears to have found solid footing among communities of people interested in politics, the core subject in this dissertation. It also allows the researcher to easily observe and track the flow of information (Wu, Hofman, Mason, & Watts, 2011).

Investigation on Twitter can illuminate flows of online communication that probably would exist on other modalities.

PUBLIC SPHERE AND ONLINE PUBLIC FORA

While the previous chapters discussed the importance of investigating political discussions in SNSs and the actual content of discussions, this chapter focuses on the discursive dimension of online public fora. It first introduces the notion of the public sphere as defined by Habermas and next addresses the limitations of the Habermasian public sphere, followed by an alternative interpretation of its conception. By opening up to both Habermasian and alternative perspectives, the current study derives research questions about the flows of information and influence and the diversity of content, which are primary constituents of the public sphere.

According to Habermas (1989; 1996, p.360), between the civil society and the state stands the public sphere, "a network for communicating information and points of view," to inform the state with the needs of the civil society. In the 17th and 18th centuries, salons and coffee houses served as a public sphere where social intercourse reached across the strata of the middle class and where criticism about cultural production and politics was centered, a sphere independent from public authorities and government hierarchies. Habermas (2006) argues that in such spheres, public opinion can be formed through critical and rational debate, and this deliberation can be supported by the wider range of information and perspectives.

While striking an important chord within the cadre of scholars and critics examining how public opinion is manifest and how political opinions take shape, the Habermasian notion of public sphere operations based on rational and deliberative debate has been criticized for being an ideal (Garnham, 1992) and ignoring the existence of multiple public spheres of counterpublics (Fraser, 1992). In the Habermasian public sphere, the discursive rationalism on which the elites have been trained is favored and other modes of symbolic expression such as parody and humor are disregarded (Dahlgren, 2005). Several scholars criticize Habermas's theory for failing to bridge the public spheres and for his highly utopian conception of democratic society. McCarthy (1992), for example, argues that consensus based on demonstrative and rational arguments cannot be possible, since there are no universal norms applicable to every case, and Schudson (1992) illustrates that the Habermasian model has not been realized in American political history.

Previous research on online public fora, based on perspective of the Habermasian notion of the public sphere, had negative conclusions regarding their impact on democracy (see Table 1). They pointed out that online public fora are filled with lower quality of discourse, enclave communication, trivial/episodic content, partisan/celebrity politics, and narcissism/agonism/commercialism without gaining attention from policy makers. However, studies that did not limit their conceptual basis to Habermas's rational-critical deliberation had explanations contrary to the ones above. They illustrated that online public fora have higher equality, more traversibility to other modes of communication, higher communicative reflexivity, less manipulation of public opinions,

and more opportunities to hear minority voices, with enhanced access to government information.

Detrimental to democracy	Beneficial to democracy
• Degenerating the public sphere by lowering the quality of discourse along with the increase in the quantity of discursive participation (Habermas, 1989) • Allowing systematic and individualized filtering of information and fostering "daily me" and "echo-chamber" of like-minded people (Sunstein, 2007) • Far from the Habermasian model of the public sphere, since testimony, story-telling, greetings, and audio-visual modes of communication dominate the networked public sphere, rather than the rational-critical deliberation (Loader & Mercea, 2011) • Composed of populist rhetoric, extremism, and celebrity politics (Loader & Mercea, 2011) • Filled with "narcissistically derived, civically beneficial expressions of political opinion," "subversive actions articulated in discourse that emphasizes plurality and agonism," and "privately generated narratives published in commercially public spaces" (Papacharissi, 2009, p.244) • Failing to draw attention of policy decision makers (Hurwitz, 2003; Jenkins & Thorburn, 2003)	• More egalitarian without having social cues, more open in exchanging ideas, more conducive to having intimate and direct questions, and more comfortable to express disagreements, compared to face-to-face discussions (Price, 2009) • Enhanced "traversability" (Brundidge, 2010b) across communicative spaces, which increases the strength of the link between information and action (Delli Carpini & Keeter, 2003) • Increased communicative reflexivity of the public to revisit, reconsider, and respond to perceived public opinions through the access to fellow citizens' opinions and group judgments (Friedland, Hove, & Rojas, 2006) • Forming a networked public sphere with many sub-groups of mutual interest and with non-market, peer-produced alternative sources of filtration and accreditation, instead of being manipulated by a few voices as in the mass-media-dominated public sphere (Benkler, 2006) • More chance given to people with poor political resources to join the democratic process, fostering participatory political culture (Loader & Mercea, 2011) • Enabling the public to access to government and political information, monitor governments and corporate interests, expand connection to weak ties, and disseminate information (Loader & Mercea, 2011)

Table 1: The Impact of Online Public Fora on Democracy from the Perspective of the Habermasian Public Sphere

As denoted in the clear contrast between studies that adhered to Habermas's conception and those that eased its definitional boundary, empirical studies that examined the extent to which online political conversation meets the criteria for deliberativeness commonly found that online political conversation falls short (for review, see Eveland, Morey, & Hutchens (2011)). This negative finding seems to be somewhat pre-determined by comparing online public fora to the ideal public sphere. That ideal notion of a deliberative public sphere can disregard the real context or the everyday life settings where political discussions take place with less rational and serious intent. This concern was well reflected in Eveland et al. (2011, p.1086):

> The deliberative framing of political conversation research can lead to unrealistic expectations about the function of political conversation in the lives of individuals, and possibly undue attention to certain aspects of political conversation to the relative exclusion of others.

Seeing the limitation of Habermas's theory in explaining emerging online public fora, Papacharissi (2009) posited Habermas's model as a normative, theoretical construct that people pursue and that cannot be empirically found or tested. The author argued that online public fora are not a "public sphere" but a "public space": It is not for deliberation or rational-critical discourse, but for political expression; it is not independent from external forces, but does intermingle with commerce, where it may be hard to discern public and private realms. Papacharissi (2009), by regarding Habermas's model as a metaphor, avoids the possible deadlock in explaining the democratic potential of online public fora that do not fit the Habermasian public sphere but might have a positive impact on democracy. However, it raises doubts regarding the theoretical usefulness (Reynolds,

1971) of Habermas's model if it only serves the role of a metaphor. No one might disagree that deliberation is desirable in a normative sense. If Habermas's model does not contribute any more than simply confirming this norm, it loses its theoretical value and validity. However, up to the present, much literature has treated Habermas's model as a theory which can be empirically tested. Moreover, considering online public fora as a public space, as suggested by Papacharissi, does not help to consider facets of the public sphere hidden in Habermas's model that still may be valuable for democracy. The concept of public space does not convey civil society, nor does it relate the private and the public realms. The relegation of the Habermasian public sphere as a metaphor and online public fora as a public space seems to hinder the theoretical development of the public sphere and our understanding of online public fora in the context of the democratic process.

Instead of dismissing the Habermasian notion of the public sphere, several studies illustrate different responses to Habermas's model: One is to update the theory based on its current form, and the other is to shed light on uncovered aspects of Habermas's public sphere. Among studies that proposed a theoretical update of Habermas's model, Friedland et al. (2006) mentioned that the Habermasian model of the public sphere needs to be improved by considering the rise of the networked public sphere. Facilitated by information and communication technologies, the communicative power of ordinary citizens has been increased, which allows civic interaction without the mediation of mass media. In addition, the networked public sphere can complement deliberation through enhanced communicative reflexivity by having access to fellow citizens' opinions and

group judgments. In these regards, the authors argue that the Habermasian public sphere needs to embrace the networked public. The other tendency of political communication research on public spheres focuses on emotional expressions rather than rational deliberation in online public fora. Several studies explain that political conversations in everyday life do not resemble rational-critical discourse, and they are more likely to be in the form of emotionally appealing remarks and expressives. Branching out from the heavy reliance of political communication research on deliberative theory, studies in recent years have started to examine the use of expressives (Graham 2010) or outrage (Sobieraj & Berry 2011), by considering that emotional appeals can highlight particular issues and promote political participation.

On top of these discussions, Dahlgren (2005) suggests a new conception of the public sphere, embracing online public fora as a networked public sphere and not privileging rational-critical deliberation over emotional expressions. According to Dahlgren (2005), irrespective of the form of deliberation in discussions, horizontal communication prompted by civic interaction promotes civic cultures, which close the distance from political participation by creating a venue for freely sharing information and opinions. In this vein, civic interaction itself is important, since this daily interaction, not deliberation per se, can contribute to forming collective identities and mobilizing social actions (Choi & Park, 2012). This perspective is supported by Shah et al. (2005). They consider that it is not so much the *nature* of the discussion, but the discussion or interaction itself that might stimulate participation. Online interaction can elicit new modes of expression and deliberation with fewer time and place constraints than

traditional forms of interaction (Shah et al., 2005). Standing out of the ideal frame of the deliberative public sphere, the Internet as a potential place for political discussions and a barometer of public opinion can provide symbolic empowerment to civil society and promote active civic involvement, rather than simply passive spectatorship (Bucy & Gregson, 2001).

This perspective can be traced back to Dewey (1927, p.208) who put less stress on the knowledgeable competence of the public in making political judgment than on the "improvement of the methods and conditions of debate, discussion, and persuasion" of the public. In this regard, online public fora can provide another venue for civic interaction and political expression and constitute another form of public sphere. Taken together, while most previous studies (see Eveland et al, 2011) have applied the theory of deliberation to assess political conversations, the present study acknowledges both conceptions of public sphere made by Habermas and Dahlgren: Rather than assuming rational deliberation is an essential factor for constituting public sphere, this study opens up the possibility of having non-conventional forms of a public sphere.

Compared to a mass-media-based public sphere, online public fora seem to play the role of social mediation better in the sense that they are more open to access[3] and less susceptible to governmental or corporate forces (Himelboim, 2010), although they might be far from the ideal public sphere. The main concerns are *how the information and*

[3] This study acknowledges that limitations to access to online public fora still exist for those who do not have Internet connections or digital skills. Nonetheless, compared to the mass-media-based public sphere where speech rights of the public are constrained, online public fora provide much more room for expression by ordinary citizens.

influence are spread across people, what content is actually shared among them, and whether they communicate with the government in online public fora. In the following sections, research questions about the discussion structure of online groups, the flows of information and influence from who to whom, the actual discourse shared among participants, and the interaction with the e-government outlet are examined.

Structure of Online Political Discussion Network

The egalitarian architecture of the Internet was expected to promote many-to-many interactions and less inequality in terms of participating in online public fora. However, findings of several studies do not support this expectation. Himelboim (2008) investigated 30 Usenet newsgroups of politics and health and found that the number of replies and posts has highly skewed distributions irrespective of topics. The disproportional distribution of the number of messages is identified in another sample of Usenet newsgroups of politics by finding the existence of a power-law distribution (Himelboim, 2010). This heavy-tailed distribution (i.e., a few people responsible for most of the messages) is also found in Wikipedia discussion pages where only a few discussions have drawn several thousand chains of sub-threads (Laniado, Tasso, Volkovichz, & Kaltenbrunner, 2011). Overall, most people neither post messages nor have replies and only a few have several posts and replies in the newsgroups.

While a skewed distribution of posts and replies might suggest the limited egalitarian potential of online public fora, some positive aspects are detected.

Investigating Usenet newsgroups, Fisher, Smith, and Welser (2006) illustrate that reply rates and being-replied-to rates are similar for most participants. Not only does the relationship between replies given and replies received exhibit statistically significant correlations, but also the relationship between messages posted and replies received has similarly significant correlations with each other (Himelboim, 2008; 2010). These results might indicate the quality of equality in the sense that people who actively participate in the discussions are those who also get the most attention from others. Although the term "equality" is difficult to define and measure, the phenomenon of investing more and getting back more might imply that online public fora are less distracted by external cues such as socioeconomic status, education, and social connections and prone to allow participants to focus simply on the discussion at hand.

Unlike these studies based on asynchronous postings on Usenet, more investigations need to be done to learn how political discussion takes place in the setting of synchronous interaction, which better facilitates discussion and which is more characteristic of contemporary Internet opportunities. Specifically, by examining the structure of discussion networks, questions such as how many people are isolated from the discussion, how much the discussion is concentrated on a few participants, and the equity in the process of sending and receiving comments can be addressed.

RQ1. What is the structure of the discussion network that takes place among participants in an online community dedicated to political discussions?

Flows of Information and Influence

As depicted by Katz and Lazarsfeld (1955), mass media research has been interested in the effect of the mass media on opinions and attitudes, and several theories have attempted to explain the flow of communication between media and the mass. Among those early theories, was the so-called hypodermic needle theory or magic bullet theory which was advocated by Lasswell (1948). This perspective assumes a strong effect of mass media by affecting audiences directly and immediately, on which the model of source-message-channel-receiver is based. It was criticized for focusing on the unidirectional linearity from media to audience and for ignoring interpersonal relations which might mediate media messages.

Given this limitation, Lazarsfeld, Berelson, and Gaudet (1948) proposed the two-step flow of communication, positing that the flow of information from media to the public is mediated by opinion leaders who tend to be more exposed to media messages and exert personal influence on opinions and attitudes of close others (Katz, & Lazarsfeld, 1955). This model has been criticized for negating multiple steps of flows (Himelboim, Gleave, & Smith, 2009). Later, diffusion of innovations theory as suggested by Rogers in 1962 complemented the simplified two-step flow model by addressing a series of steps in spreading information throughout society (Rogers, 1995). This theory considers that the introduction of innovation can come not only from opinion leaders who tend to position at the center of the social network but also from those who are located at the margins of the network (Rogers & Kincaid, 1981). However, it also has been criticized for not

attending to the context of communication and for emphasizing a linear adoption process (Rogers, 1976), although he amended this later.

Recently, the two-step or multi-step flow model that assumes the presence of interpersonal influence on the information flow has been challenged by Bennett and Manheim (2006). Proposing a 'one-step flow model,' they argue that social and technological changes such as social isolation, personalized media consumption, and narrowcasting technologies allow people to receive messages directly from the media and reduce the role of opinion leaders. Covering Bennett and Manheim's one-step flow model, Thorson and Wells (2012) suggest a more comprehensive framework to understand the contemporary dynamics of information flow. This framework is labeled 'curated flows,' which are composed of strategically, automatically, personally, and socially curated flows. Among the four flows, socially curated flow is most pertinent to the current study, which is defined as the information flow curated by one's social network. Unlike Bennett and Manheim, Thorson and Wells argue that the one-step flow phenomenon is a part of information flow that takes place in strategic curation such as online political campaigns directed to certain individuals and that the two-step flow phenomenon still exists especially in social curation such as the information exchange among peers on SNSs. Moreover, they claim that social curation can play a role as a buffer against messages received through strategically curated flow by elites or media. However, they do not empirically demonstrate that the two-step flow of communication occurs in socially curated flow.

As argued by Thorson and Wells (2012), the two-step flow of communication might still have explanatory power for understanding the flow of information in online groups. The record of communication currently available on the Internet can help to test out this theory in an empirical setting of political discussions, even though interest in it faded in the past several decades since it lacked empirical support in regards to political affairs (Mutz & Young, 2011; Weimann, 1991). Recent studies related to the two-step flow of communication have focused on the diffusion of innovation and marketing research, whose context is likely to be different from the flows of information and influence in political communication (Gitlin, 1978). Not much has been explored in the context of politics other than examinations of characteristics and roles of opinion leaders in forming public opinions. How information flows in an empirical setting and how opinion leaders emerge from this flow of information still remain to be answered (Watts & Dodds, 2007). In this regard, the present study examines whether the two-step flow of communication model can be extended to online public fora.

H1. The flow of information within an online political discussion group follows the two-step flow of communication.

In addition, as pointed out by Weimann (1994), the distinction between flow of information and flow of influence is not clear in the literature. Based on empirical findings, Weimann (1991) explains that opinion leaders are different from influentials in that they are more widely distributed across social strata, more concentrated on a specific subject area, and more exposed to mass media. Moreover, by operationalizing the flow of

information as the network of who to whom news, consumer information, and gossip were distributed, and the flow of influence as the network of who to whom advice was sought, the flow of influence is found to take place through strong ties within a group, whereas the flow of information occurs through both strong and weak ties within and across groups (Weimann, 1983). These two seminal studies explore the difference between flow of information and flow of influence in terms of attributes and tie strength, but more needs to be done to understand the difference by investigating sub-structures of these flows. In this vein, major sub-structures that denote the existence of intermediary, transitivity, and hub/source are explored, which has been frequently addressed in previous studies on social and information networks (e.g. Robins, Snijders, Wang, Handcock, & Pattison, 2007; Shumate & Palazzolo, 2010; Weber & Monge, 2011). Detailed explanations about these sub-structures are provided in the Methodology chapter.

RQ2. How is the flow of information different from the flow of influence within an online political discussion group?

Opinion Leadership

With interpersonal relations functioning as intervening variables to explain the effect of mass media on the public, the characteristics of opinion leaders have become newly important to understand this effect. They are neither apart from a group nor do they have conventional opinion leader traits as Rogers (1995) defined them; they emerge from the give-and-take of information and influence in everyday personal relationships

and can be found on every social, economic, or occupational level (Katz & Lazarsfeld, 1955). The classic concept of opinion leadership has been further elaborated as being related "(1) to the personification of certain values (who one is); (2) to competence (what one knows); and (3) to strategic social location (whom one knows)" (Katz, 1957, p.73). In other words, opinion leaders tend to personify certain values, to have more familiarity with certain issues, and to be positioned at the center of certain social networks. Based on this conceptualization, previous studies have found that opinion leaders are more exposed to the mass media, are considered as experts in a specific field among others, join more various social activities and social organizations, and have higher level of interest in relevant issues and access to resources (for review, see Weimann, Tustin, van Vuuren, & Joubert (2007)).

Considering that most of the research literature has examined opinion leadership situated in the mass media environment, these findings could be interpreted differently in the new media environment. In the new media environment, social relationships can be mediated through SNSs, and the public can not only consume information but also create content. Creating content such as producing images or video clips calls for higher levels of digital skills and cognitive efforts than simply importing content from elsewhere. Opinion leaders with more knowledge resources might be more engaged in producing content than those who are not opinion leaders.

In addition, since opinion leaders are regarded as those positioned at the strategic location of the network into which useful information and resources are channeled, their

remarks are likely to be worthy to gain attention. Huckfeldt (2001) found that people were able to perceive a group of people who are more politically knowledgeable and shared more discussions about politics with that group than others in one's discussion network; in the present study, we call the group of people opinion leaders. This perception of and frequent discussion with opinion leaders might lead to the greater influence of messages written by opinion leaders. Although opinion leaders play a central role in the flow of information, it does not necessarily mean that their messages are more influential than others. If their messages are frequently passed along by others, which connotes the potential to shape the discussion, we can regard them as having social influence and label them as influentials.

Taken together, hypotheses regarding opinion leaders could be as follows:

H2-1. Opinion leaders are likely to create content more frequently than non-opinion leaders.

H2-2. Messages written by opinion leaders have greater social influence than those written by non-opinion leaders.

Content of Discussion

Exposure to heterogeneous viewpoints has been considered essential and critical to the work of democracy (Brundidge, 2010a; Gonzalez-Bailon, Kaltenbrunner, & Banchs, 2010). Sunstein (2007) argues that without acknowledging different ideas,

society will be less tolerant of differences and be fragmented. However, selective exposure to similar viewpoints also appears to have other important - or even invaluable - outcomes. Based on survey results, Mutz (2006) found that people in cross-cutting discussion networks tend to participate less in politics. This finding is explained that people facing political disagreements are likely to end up with ambivalent viewpoints and feel social accountability for maintaining interpersonal harmony, which turns out to discourage political participation. The author concluded that homogeneous networks work better for political activities than heterogeneous networks. In this sense, exposure to heterogeneous viewpoints might be dysfunctional for political participation, contrary to Sunstein's notion. This double-sidedness of the selective exposure phenomenon is also discussed in Stroud (2008), who found that selective exposure can hinder creating public policies that satisfy the general public while it also can motivate people to participate in politics.

The prevalent use of SNSs seems to bring a more complicated picture of selective-exposure phenomenon to the fore (Mutz &Young, 2011): In one sense, SNSs can contribute to passive selective exposure by allowing people to be exposed to content highly personalized by their seemingly like-minded friends. However, in another sense, SNSs can increase exposure to dissimilar content by facilitating contact with a population larger than a circle of acquaintances. Unlike the previous studies that relied on survey respondents' recollection or regarded contact with others as content to which people are exposed, the present study is able to investigate the relationship between sources and ideological perspectives represented in content by exploring the actual discourse, rather

than simply lumping the two into perceived exposure to like-minded or cross-cutting content.

In addition, the form of content itself, whether emotional or cognitive, is examined. Unlike the rational and deliberative discourse accentuated by Habermas (1989), the public sphere can be a "sensational place, one that attracts and engages spectators" (Marcus, 2002, p.148). As alluded to by several scholars (Bryce, 1888; Dahlgren, 2005; Dewey, 1927), expressive conversation, not only deliberative conversation, can be another mode of political discussion for conveying political messages and may be closer to the sort of actual political talk in everyday life. Scholarly attention to emotion in political communication context was emphasized by Bennett and Iyengar (2008) who argue to realign theories with social change and decrease the gap between research and reality.

Sharing this perspective, Cho et al. (2009) consider emotionality as well as rationality as a component of intrapersonal reflection in the process of 'reasoning' between the 'stimuli' of news use and the 'response' of democratic outcomes. Some studies address emotional expressions in relation to political participation and attention to the issue (e.g. Graham, 2010; Hoffman & Young, 2011; Sobieraj & Berry, 2011). However, emotional comments containing expressives such as anger and hostility are found to detract discussions from deliberation in Graham (2010). Although emotional reactions might harm deliberation, Hoffman and Young (2011) found that satire or parody has positive effects on political participation. Freelon (2011) also found that,

compared to an online forum which regulated discussion topics and formats, an online forum which allowed more expressive latitude draws twice as many posts, despite a fewer number of both civic-related topics and participants. One might question how 'emotion-appealing, expressive conversation' as a form of political conversation along with 'rationalized, deliberative conversation,' operate in actual settings. Does one dominate in certain fora? Do online political groups typically exhibit both types of conversation? Since the literature has not developed criteria to clearly measure deliberation (Eveland et al., 2011), the present study re-frames the forms of content into emotional and cognitive.

Overall, both sources and ideological perspectives of content are examined to find to what extent diverse content is incorporated into the discussion. In terms of the source, this study explores whether the discourse refers to the traditional media source, net-based media source, user-generated source, and so on. In terms of the ideological perspective, we examine whether the discourse is like-minded, ideologically heterogeneous, or non-ideological. Forms of content are explored in order to investigate how far we might be from the ideal rational-critical discourse of Habermas, by comparing the proportions of emotional and cognitive remarks in online public fora.

RQ3-1. What forms (emotional or cognitive) of discourse does the online political discussion group share, from which sources, and from which ideological perspectives?

With respect to emotion, the effect of emotional components on information processing and furthermore on political consequences has been explored. Marcus and MacKuen (1993) found that enthusiasm increases continuous involvement in political campaigns, whereas anxiety enhances learning about politics. Valentino, Hutchings, Banks, and Davis (2008) found that anger reduces the quality or quantity of political information that people consumed by spending less time in searching information and in reading issue-specific articles, whereas anxiety leads to information seeking and learning about politics. Similar research results in regards to anxiety and anger are reported by MacKuen et al. (2010). They found that anxiety leads participants to search information challenging their opinions and be open to compromise, whereas aversion (including anger, disgust, contempt, and hatred) deters them to seek out opposing information and change their opinions, even after controlling for attitude strength, political interest, and news consumption of participants. The authors interpreted this result that anxiety and aversion have contrasting consequences for practicing citizenship, the former yielding deliberative citizenship and the latter partisan citizenship, and that selective exposure to congenial opinions is contingent upon emotional reactions (Marcus et al., 2011).

Acknowledging the importance of emotional reaction to politics and its relation to the practice of citizenship, this study examines the virality and impact of emotional remarks in online political discussion which were found to reflect public opinions and voters' political preferences (González-Bailón, Banchs, & Kaltenbrunner, 2012; O'Connor, Balasubramanya, Routledge, & Smith, 2010; Tumasjan, Sprenger, Sandner, & Welpe, 2010). Previous studies have found that emotional content is more viral than non-

emotional content (Berger & Milkman, 2011; Dang-Xuan & Stieglitz, 2012; Huffaker, 2010; Stieglitz & Dang-Xuan, 2012). Among emotional content, anger and anxiety are significant predictors of sharing content (Berger & Milkman, 2011). Heath, Bell, and Sternberg (2001) found that disgusting stories are more likely to be passed along than emotionally positive stories. Stieglitz and Dang-Xuan (2012) also found that tweets with negative emotion have more retweets than those with positive emotion in the German Twitter-verse. Considering these previous findings, the present study hypothesizes that discourse with negative emotion tends to generate social influence more than those with positive emotion. In this study, the term social influence is used to conceptualize the behavior of passing along messages and its impact on discussions.

H3-1. Discourse with negative emotion has stronger social influence than that with positive emotion.

Furthermore, this study extends the previous research that usually has focused on the comparison between emotional and non-emotional content or between positive and negative emotions (Berger & Milkman, 2011; Dang-Xuan & Stieglitz, 2012; Pfitzner, Garas, & Schweitzer, 2012; Stieglitz & Dang-Xuan, 2012) by exploring the difference between emotional and cognitive forms of discourse. Emotion and cognition in political communication have been investigated in terms of how emotion influences cognitive processes, how cognitive processes influence emotion, (Valentino et al., 2008, Way & Master, 1996) and how emotion and cognition affect political consequences such as political knowledge and political involvement (Marcus & MacKuen, 1993). In this light,

cognitive components are defined as education, knowledge, opinions, and beliefs (Conover & Feldman, 1986; Ragsdale, 1991). Different from this traditional operationalization of cognitive components, Huffaker (2010) examined cognition in an online environment and translated cognitive ability into linguistic diversity that shows an online message poster's capability to use wide and complex vocabulary. The author also included linguistic assertiveness as a factor to address a message poster's confidence and certainty in one's thoughts, which has an effect on one's credibility and social influence. Huffaker found that linguistic diversity and assertiveness are all significant in triggering feedback from others and have greater effect sizes than emotional words. In line with Huffaker's approach, the present study considers cognition within the linguistic realm and examines the impact of the cognitive form of messages on distributing messages.

H3-2. The cognitive form of discourse has stronger social influence than the emotional form.

RQ3-2. Which cognitive form of discourse has greater social influence?

Interaction with the Government

Not only discussions within groups but also interactions with the government call for investigation. The public sphere is to have discussions, generate public opinions, and ultimately inform the state about these opinions by mediating civil society and the government (Habermas, 1989). In the recent years, many governments across the world have attempted to provide better access to government information and to communicate

with citizens through using new technologies such as SNSs, blogs, and home pages (Layne & Lee, 2001; Lampe, Larose, Steinfield, & Demaagd, 2011). This is part of an e-government movement which seeks to enhance efficient interaction among government agencies, implement online service delivery, apply e-commerce to government transactions, and realize digital democracy (Jaeger & Thompson, 2004; Moon, 2002).

These efforts are found to enhance the interaction between the government and citizens by providing relevant information, (Reddick, 2005), although many scholars claim that the real promise of transparency and citizen participation through e-government efforts have not been realized. Wigand (2010, p.68) suggests four roles of Twitter for the government, including extending reachability, updating/sharing information, building relationships, and collaborating with stakeholders. In the case of certain Asian governments, Facebook, Twitter, or YouTube are found to contain web pages mostly for official government channels, i.e. information transmission (46%), followed by tourism/development (27%), education (11%), and others (16%) (Kuzma, 2010)[4]. Welch, Hinnant, and Moon (2005) found that U.S. citizens are generally satisfied with the information provision of government websites, but not with the two-way interaction. These phenomena indicate that the development of e-government projects has perhaps stagnated at the stage of "media interaction" rather than that of "human interaction" by simply employing the interactive nature of the technology itself without enhancing responsiveness of human agents (Stromer-Galley, 2000).

[4] Despite the lack of methodological rigor in this analysis, it can give an overview of Asian governments' SNS use.

In the present study, communication between the government and the online group can be assessed by examining whether the group sends messages to the government and whether the government responds to them, in addition to discovering how much interaction the e-government outlet has with ordinary citizens. According to Chadwick (2003), e-government can blur the distinction between executive and legislative functions by allowing citizens to directly influence pre-legislative policy decisions of the government through online fora. Another viewpoint also suggests that e-government might contribute to political polarization by offering one-sided perspectives to reinforce their power, rather than promoting the democratic process by empowering citizens with more information and tools to interact with the government (Jaeger, 2005). From the perspective of SNSs users (Valenzuela, Arriagada, & Scherman, 2012), using Facebook for news and for socialization is a significant predictor of joining protests, but Facebook users' trust in the responsiveness of government officials to their protests does not accounted for their participation in protests. This implies that interaction with the government was not expected from people who use SNSs for political goals. These different perspectives can be discussed by exploring to what extent online discussion groups communicate with the government.

RQ4. To what extent is the discussion group engaged in dialogue with the government in online public fora?

Chapter 3: Methodology

To address research questions and hypotheses, the present study adopts both network analysis and content analysis approaches.

Previous research which examined Internet use for political purpose has employed surveys, ethnographic approaches, content analyses, and panel studies. As listed in Table 2, many studies have focused on the frequency of using the Internet for obtaining political information or messaging and the presence/absence of experiences facing cross-cutting content. Content analyses on postings did not go further than describing the types of messages. More recently, network analysis has been applied to unveil the process of communication in online fora. While traditional methods are mostly based on respondents' recollection or researchers' observation and interpretation, network analysis can analyze interactions recorded on the Internet, which have been difficult to represent in other ways. Network analysis is an especially useful method to examine the broad diffusion of information in political communication settings where political discussion networks are found to be much larger than acquaintance networks (Eveland & Kleinman, 2011), and it is uniquely capable of characterizing discussion networks in terms that are responsive to the research questions of this dissertation.

Method	Study	Internet-related variable
Survey	Brundidge (2010a), Halpern & Lee (2011), Kim (2011), Scheufele & Nisbet (2002), Stroud (2008), Wojcieszak & Mutz (2009), Yang (2003), Johnson et al. (2010)	• Frequency of using online news/SNSs/online political messaging or chatting • Presence/absence of experiences being exposed to cross-cutting opinions online • Likert scale of agreeing/disagreeing with opinions encountered online • Likert scale of the reliance on SNSs
Ethnography	Mehra et al. (2004)	• Interviews and observation on the Internet use of low-income families, sexual minorities, African-American women
Content analysis	Wilhelm (1998), Freelon (2011)	• Coding postings of Usenet newsgroups in terms of providing/seeking information, validating/replying to other messages, intensity of political affiliation, etc. • Coding postings of online discussion groups in terms of consumer activism/online engagement/offline media creation and government/mainstream news media/voluntary organizations/religious institutions
Panel study	Jennings & Zeitner (2003), Price (2009), Shah et al. (2005)	• Frequency of seeking political information online/using Internet for politics/messaging on politics online • Difference between attendees and non-attendees of online political discussions in terms of offline political discussions and political participation
Network analysis	Adamic & Glance (2005), Himelboim (2008, 2010)	• Distribution, size, reciprocity of replying and being-replied-to networks of Usenet newsgroups • Sources of imported content • Number of URLs citing ideologically dissimilar blogs

Table 2: Studies on the Internet Use for Political Purpose by Methodology

Most of studies that conducted network analysis (Fisher et al., 2006; Himelboim, 2008; Himelboim, 2010; Laniado et al., 2011) have examined bulletin-board-style Usenet

newsgroups and focused on the structure of discussions. Content of discussions has been rarely addressed, except introducing topics discussed in the posts. Seeing this gap in the literature, this study explores online communities based on SNSs, having more interaction and synchronous communication than Usenet newsgroups, and investigates the content of discussions as well as the structure of discussions. Specifically, network analysis is applied to configure the structure of the communication network among participants and the flow of information in the online political fora, and content analysis is used to understand the context of discussions. This combination of network analysis and content analysis helps to have system-level understanding without losing nuanced context embedded in the content (Gleave, Welser, Lento, & Smith, 2009).

In sum, through a survey of methodologies of previous research, the current study employs both network analysis and content analysis. It selects online communities based on Twitter. Rationales for this selection are provided in the sections of 'research setting'. The 'methods' section offers detailed explanation on network analysis and content analysis. Last, specific measures for each research question or hypothesis are illustrated in 'analysis plan' section.

RESEARCH SETTING

For this investigation, online discussion groups are selected from Twitaddons.com which was launched in March 2010 from South Korea. Twitaddons.com, an add-on application to the original Twitter service, facilitates social gathering for thematic

discussions in the Twitter-based environment (Choi, Park, & Park, 2012). Why Twitaddons.com and South Korea are chosen in this study will be explained in the following accounts.

On the basis of the Twitter platform, the group organizing feature of Twitaddons.com supports more long-standing and sustainable exchanges of ideas through community-based debate than does Usenet, where threads of discussions are created by unknown passers-by who post or reply to messages. Additionally, on Twitaddons.com, a whole network of an online group is retrievable. The whole network provides information which one is not able to gather from an ego network of an individual. Through a whole network approach, characteristics of the network structure and relationships between participants can be measured (Lewis, Kaufmana, Gonzaleza, Wimmerb, & Christakis, 2008). Moreover, roles of individuals positioned in a certain nexus of the network can also be identified in the whole network (Hogan, 2008). The most commonly addressed disadvantage of the whole network approach is its arbitrary specification of the network boundary (Chen & Tan, 2009). However, in the present study, this objection can be overcome through analyzing online communities which have their own natural boundaries without any intervention from the researcher (Rogers & Kincaid, 1981).

In the context of South Korea, well-known for its high broadband penetration and a series of public campaigns that were catalyzed within the cyberspace[5] (Park &

[5] The examples of public campaigns catalyzed within the cyberspace are the candlelight protest of 2008 against the Korean government's decision to import the U.S. beef without going through the

Jankowski, 2008), more than 10% of total population used Twitter as of November 5, 2011 and still more people are joining Twitter at a rapidly increasing rate (Etnews, 2011). According to the online survey of Twitter users who were sampled from 15,000 panels by the Korea Information Society Development Institute (Lee et al., 2010), 70% of respondents used Twitter once or several times a day. On a daily basis, they sent out 3.7 Tweet messages to others, retweeted 2.65 messages, and posted 2.22 Tweet messages on average. Among 61% of respondents who were following or being followed by celebrities, the top two reasons for having this connection were to get opinions or replies from celebrities and to garner information related to the celebrities, rather than to expand one's social network. These responses as well as the frequent exchanges of Tweets suggest that Twitter has been regarded as the "hub of a real-time information network"[6] in South Korea (Lee et al., 2010, p.13).

Moreover, the political current within Twitter has been demonstrated to be influential on political outcomes as exemplified in the recent by-election of the mayor of Seoul, the capital of South Korea (Dong & Jung, 2011). After this election, political parties even decided to hire social network experts to influence public perceptions on Twitter (Kwon & SongChae, 2011). The power of Twitter was also revealed in the general election of 2012 (Joo, 2012). Several studies have explored the political use of Twitter in Korea (Hsu & Park, 2012; Kim & Park, 2012; Park & Jankowski, 2008).

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process of having a nationwide consensus and the election campaign of "Rohsamo," an online-based fan club of the former Korean president Roh Moo-hyun.

[6] This phrase is translated into English from the original, "실시간 정보 네트워크의 중요한 허브," by the author.

Surveys, voting results, and relevant studies illustrated above imply that Twitter has been culturally read as a viable sounding board for political discussions and collective activism in the Korean context.

Based on these reasons, this research selects online groups from Twitaddons.com in South Korea. By inserting 'politics' as a search query in Twitaddons.com, the top five groups are selected based on the number of group members, and among these five, three groups were created by a political party or part-time laborers, rather than general publics, or had discussions irrelevant to politics. As a result, the two remaining groups that are based on grassroots activities are chosen for this study: 'People's Command' and 'Hope Republic' as labeled by themselves (see Table 3). The former, organized in August 2010, is a communication platform of a civic group with the same name, led by an actor turned advocate who urges the consolidation of the opposition parties against the ruling party. This group frames the ruling party as representing conservative, vested interests, rather than representing the public or the socially disadvantaged. 'Hope Republic' was organized in December 2010 by a citizen who runs an institute of human networks and is composed of ordinary citizens who seek to discuss politics under the system of a virtual National Assembly by having several standing committees and a plenary session. This group has three political parties named as conservative, moderate, and liberal parties and implements a presidential election via direct messaging or a bulletin board designed for secret voting.

The activities of these groups garnered some media attention. In a book entitled the "Era of Mentors" (Kang, 2012), the author examines the intensification of the partisan-based conflicts through the activity of People's Command. As well, Hope Republic was featured in the Korean Spirit (Cho, 2011), an online newspaper. In the interview with the Korean Spirit, the organizer of Hope Republic discussed how Hope Republic functions in the online environment, what kinds of social leaders are desirable in our society, and how the President should lead the state affairs.

	People's Command	Hope Republic
Launch date	8/26/2010	12/3/2010
No. of members	523	543
No. of active members (Participants)	96	147
No. of Tweets	176	442
No. of mentions	117	203

Table 3: Online Groups for Political Discussions (3/1/2011-4/30/2011)

Data, namely all tweets and their identifying information, were collected for the full two-month period from March 1 to April 30, 2011. This period is selected because it does not include any long-term national holidays or vacation seasons. All Tweets posted during this period are gathered, instead of focusing on Tweets generated by a specific person, topic, or event, since this study addresses online political discussions in daily life. Among the number of total members enrolled in these groups, members who tweeted messages or exchanged mentions during the data period are regarded as active members

or participants. As depicted in Figure 2, more than 30 messages are generated in some occasions, and typically three messages for People's Command and to seven messages for Hope Republic are posted on average on a daily basis.

In the graph of People's Command, the spikes in early March and mid-April were the time when the meeting took place among activists in the progressive camp and when the group criticized the Election Commission for deterring the voting campaign of the group, respectively. In the graph of Hope Republic, the large number of Tweet messages was created at the end of April when the group had an election campaign to vote for the president of the group.

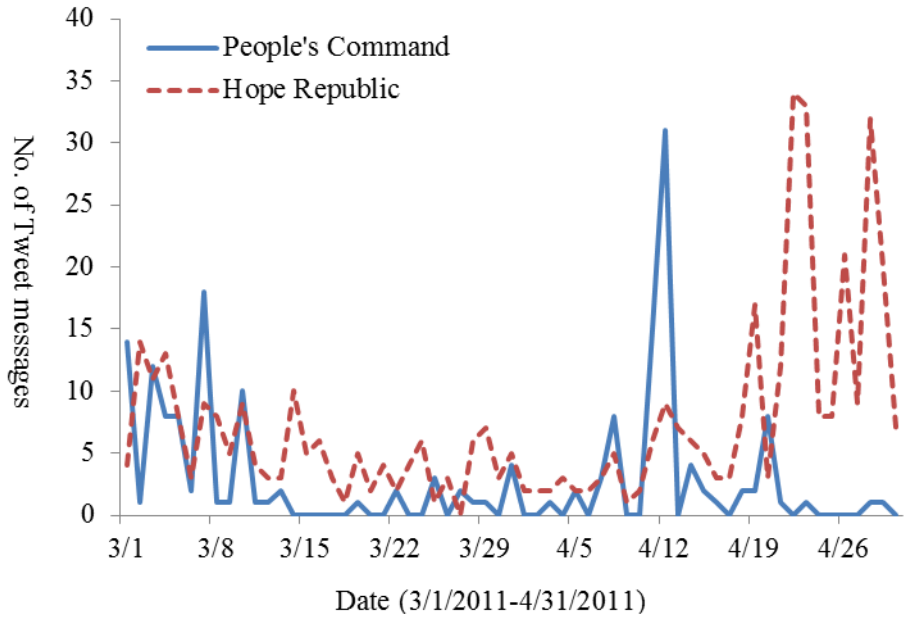

Figure 2: Number of Tweet Messages per Day by Group

For the analysis of the interaction between the online groups and the government, @bluehousekorea is selected among 138 government Twitter accounts identified in the directory of Korean Twitter. @bluehousekorea is the account of the Blue House (Cheong-wa-dae in Korean language), the official residence of the Korean President, and has the second largest number of followers next to the Korea Tourism Organization, which is not pertinent to this study. Considering that Korea follows the Presidential system and that political power is centralized to the President, communication between the President and the public is considered important, which adds more reasons to explore @bluehousekorea. Data show that 124 Tweet messages were gathered in total for the same period of time mentioned above. @bluehousekorea has 47 mentions and has connections with 25 Twitter accounts.

METHODS

Network analysis (Multi-level approach)

The present study takes a multi-level approach by encompassing individual, dyad, and system levels of analysis. This investigation across levels is available in network analysis and allows one to fully explore the richness in the data (Monge & Contractor, 2003). Although network analysis has its own limitation - namely the problem of generalizing research results with limited basis for statistical inference - it allows one to have a better understanding of the dynamics of discussion structure (Rogers & Kincaid, 1981), which was also acknowledged by Eveland and Klein (2011) in their social

network analysis of offline political discussions. Moreover, among several methods to examine the flow of communication such as hierarchical position, reputation, self-designation, and observation, social network position is regarded as more precise than others (Weimann et al., 2007). Notably, the role of an individual in the community, i.e. opinion leaders in this study, can be discovered through the network analysis, rather than being predetermined by the researcher (Garton, Haythornthwaite, & Wellman, 1997; Haythornthwaite, 2007). Since the role of individuals is not assigned but identified by network indices, network analysis can reduce arbitrariness or possible bias made by the researcher.

Among various network analyses, social network analysis examines "a set of socially relevant nodes connected by one or more relations" (Marin & Wellman, 2011, p.11). According to Borgatti, Mehra, Brass, and Labianca (2009), social networks can be formed based on similarities, social relations, interactions, and flows. For instance, when two nodes (or actors in the network) have similar attributes, share kinship, communicate with each other, or exchange information, a connection can be made between the two nodes, and a network can be constructed with several connections among nodes. The present study examines a communication network which can be a part of social network composed of actors sharing conversations with each other.

Networks of online discussion groups are constructed from mentions collected for each group. Mentions are directed to a person by containing @ sign in front of Twitter IDs. Considering that mentioning another participant is likely to evoke conversations

(Barash & Golder, 2010), this study uses the data of mentions to form the networks of communication among participants. For instance, in the following Tweet message, connections are made between message sender → target such as romeo0102→blu62, romeo0102→sangawon, romeo0102→UNIFYCOREA, and romeo0102→kim3moon1[7].

> romeo0102 RT @blu62: @sangawon @UNIFYCOREA @romeo0102 @kim3moon1 #ROKH [Hope Republic] Hi. I am going to run for election to the leader of the center party…[8]
>
> Note: Translation from Korean to English is provided by the author. The original is provided in the footnote.
>
> Source: Twitaddons.com

This study defines the mention network as the information network, following previous studies (Conover et al., 2011; Yang & Counts, 2010) which examined the diffusion of information through the mention network of Twitter. The flow of information can be captured by mentioning among participants as exemplified below:

> blu62 @happygreen1 #ROKH Isn't it difficult to find respectable companies and businessmen? I also looked for those to write for my book, but were not able to find one. Businessmen, especially entrepreneurs who run their own companies, should try harder to gain respect from our society. I think relevant issues should be raised and garner public attention.[9]

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[7] Twitter IDs are disclosed, since these messages are open to the public without requiring a log-in account to read.

[8] romeo0102 RT @blu62: @sangawon @UNIFYCOREA @romeo0102 @kim3moon1 #ROKH [희망공화국]안녕하세요.보궐중인 중도당 대표일꾼에 출마합니다…

[9] blu62 @happygreen1 #ROKH 존경할만한 기업,기업인 찾기 쉽지 않으시죠? 저도 집필중인 책때문에 알아봤는데 눈에 띄질 않네요.우리나라 기업인,특히 오너기업인들의 분발 촉구합니다. 이슈가 많이 제기되고 또 뜨겁게 달구어져야만 한다고 봅니다.

happygreen1　@blu62 #ROKH Maybe only Yuhan Corporation ㅠ.ㅜ* How miserable the business culture in our society is. Further check this company^^**[10]

* This emoticon denotes tear-drops from eyes.

** This emoticon denotes smiling eyes.

Note: Translation from Korean to English is provided by the author. The original is provided in the footnote.

Source: Twitaddons.com

Mention networks are composed of active members who posted Tweets or who were mentioned by group members in online fora during the study period, irrespective of their exchange of mentions with others. Therefore, these networks include participants who only posted Tweets without exchanging mentions with other members. The number of nodes in mention networks is 96 for People's Command and 147 for Hope Republic.

Content analysis & co-word analysis

Content analysis can be defined as "a research technique for the objective, systematic, and quantitative description of the manifest content of communication" (Berelson, 1952/1971, p.18). Content analysis is ordinarily limited to analyzing manifest content (not latent responses), based on clearly stated rules and procedures which allow other researchers to replicate the study. All the content under review is assigned to one of the categories relevant to research questions or hypotheses. Through content analysis,

[10] happygreen1　@blu62 #ROKH 유한양행정도 ㅠ.ㅜ 너무한 우리사회의 기업문화 확인해 보세요^^

each category collects the numerical frequencies of the content item that has occurred or that is present in a conversation[11]. This method has been frequently applied to Web analysis (Herring, 2012). In the process of developing categories for coding, training coders, and checking inter-coder reliability after coding, this study follows guidelines suggested by Lombard, Snyder-Duch, and Bracken (2002) that cover selecting appropriate inter-coder reliability indices and implementing the coding procedure.

In addition to the content coding, co-word analysis is conducted to configure clusters of discussions (Callon, Coutrial, & Laville, 1991). While content analysis quantifies the content by producing the frequency of words for each category defined by the researcher, co-word analysis is closer to a qualitative analysis by revealing relationships of words that appeared in the content (Biddix, Park, & Wang, 2009). This analysis measures the co-occurrence of words in the textual data, creates semantic associations, and maps clusters of discussions.

ANALYSIS PLAN

Guided by the research schema below (see Table 4), specific measures for each research question or hypothesis are explained.

[11] Sometimes quantification in content analysis does not necessarily involve numbers but can be words such as 'more' or 'always.'

Topic		Research question	Operationalization	Method
Network Macro (Whole network)	Structure	RQ1. What is the structure of the discussion network that takes place among participants in an online community for political discussions?	Degree of concentration, inclusiveness, equitability in mention network	Gini coefficient, inclusiveness index, correlation between out- & in-degree
Meso (Node-to-node relations)	Flows of information & influence	H1. The flow of information within an online political discussion group follows the two-step flow of communication. RQ2. How is the flow of information different from the flow of influence within an online political discussion group?	Interaction between & within opinion/non-opinion leaders in mention network Sub-structures of mention and retweet networks	Block modeling (op. leaders: high degree&betweenness) ERG modeling
Micro (Indivi-dual)	Opinion leadership	H2-1. Opinion leaders are likely to create content more frequently than non-opinion leaders. H2-2. Messages written by opinion leaders have greater social influence than those written by non-opinion leaders.	IV: frequency of messages being retweeted, number of hyperlinked content created DV: opinion leader or not	Binary logistic regression
Content	Discourse	RQ3-1. What forms of discourse does the online political discussion group share, from which sources, and from which ideological perspectives? H3-1. Discourse with negative emotion has greater social influence than that with positive emotion. H3-2. The cognitive form of discourse has greater social influence than the emotional form. RQ3-2. Which cognitive form of discourse has greater social influence?	Classification of content (source, ideology, form) & Clusters of discourses IV: emotional & cognitive variables DV: frequency of messages being retweeted	Content analysis & Co-word analysis Negative binomial regression
Interaction with the government		RQ4. To what extent is the discussion group engaged in the dialogue with the government in online public fora?	Interaction between @bluehousekorea & the groups/citizens	Cross-mentioning Ego network of @bluehousekorea

Table 4: Research Schema

Structure of the discussion network (RQ1)

The first research question of the discussion network structure (i.e. mention network structure) was explored by measuring the qualities of the whole network per se. In order to ascertain how concentrated, inclusive, and equitable the discussion network is, the gini coefficient, the inclusiveness index, and the equitability index were used to understand the network characteristics.

The gini coefficient is a measure of concentration in the overall network: A value of zero means perfect equality and a value of one equals to perfect inequality. This index can indicate the extent to which discussions in the groups focus only around a few individuals. The more the mentions are evenly exchanged across participants, the lower the gini coefficient.

Inclusiveness was calculated through dividing the number of participants who sent, received, or exchanged mentions at least once by the number of active participants who only posted tweets and did not participate in the discussion. The inclusiveness index can demonstrate how many group members join the discussion and how many members, who were clearly using Twitter at that time, are isolated from the discussion.

Lastly, equitability was operationalized as the degree of correlation between the out-degree and in-degree distributions. Out-degree denotes sending out mentions to others and in-degree means receiving mentions from others. Sending more messages does not necessarily lead to receiving more messages, since each message is competing for the limited attention of participants (Recuero, Araújo, & Zago, 2011). If the correlation

between the two is found to be statistically significant in a positive direction, it can be interpreted as equitable in the sense of receiving more attention or response by contributing more to the discussion (Himelboim, 2008). Kendall's tau correlation coefficient was employed, because it is more robust in measuring the degree-degree association with a heavy-tailed degree distribution, compared to other correlation coefficients such as Pearson's r and Spearman's rho (Raschke, Schläpfer, & Nibali, 2010).

Flows of information (H1)

For the investigation into the flows of information and influence, node-to-node relations were examined. According to Katz and Lazarsfeld (1955, p.33), "opinion leadership is not a trait which some people have and others do not," but rather, it is "an integral part of the give-and-take of everyday personal relationships." In other words, opinion leadership is a social construct based on relations, rather than demographics or attributes of a certain type of people.

The analysis of the network built from the interpersonal exchange of mentions configures the flows of information, which might or might not result in finding opinion leaders. Opinion leaders can be identified in the case when a group of participants are positioned in the nexus of information flow and dominate a remarkably large share of discussions. Their existence can be visualized in the discussion network as well as evidenced by the indices of degree centrality and flow betweenness of each participant. The share of degree centrality by participants indicates the share of discussions

attributable to each of them. Flow betweenness[12] demonstrates the "amount of flow in the network that would not occur if the node were not present (or were choosing not to transmit)" (Borgatti & Everett, 2006, p.474). Participants with high flow betweenness are those in the position to facilitate the flow of information in the network. In this research, opinion leaders were defined as those who have high share of *both* degree and flow betweenness centralities. This operationalization is supported by Lee and Cotte (2009) and Mullen, Johnson, and Salas (1991) who found positive correlation between opinion leadership and network centrality indices.

The hypothesis that the flow of information within online discussion groups corresponds to the two-step flow of communication was tested with block model analysis. Block modeling is a useful measure to account for role relationships such as giving or receiving information (Garton et al., 1997). It generates block density, which is the proportion of existing connections against all possible connections (Hanneman & Riddle, 2005). After identifying opinion leaders among participants, the relationship between opinion-leader block and non-opinion-leader block can be represented as Figure 3: (a) and (d) indicate communication within each block (intra-block density); (b) means the conversation initiated by opinion leaders towards non-opinion leaders (inter-block density), and (c) vice versa (inter-block density). If the two-step flow of communication exists in online group discussions, the size of block density would increase in the

[12] This study adopted flow betweenness centrality, instead of the widely-used betweenness centrality. The latter is generated by binarizing the data into presence or absence of a connection, while the former fully utilizes information from the valued data. Since the current study has a valued data and attempts to explore the flow of information, flow betweenness centrality is a better index than the common betweenness centrality.

ascending order of (d), (b), and (c). This implies that non-opinion leaders, i.e. general participants, communicate more frequently with opinion leaders than they communicate with other non-opinion leaders, and refer to opinion leaders more frequently than opinion leaders refer to them. The network data were dichotomized into zero (when a tie is absent) and one (when a tie is present) for this analysis.

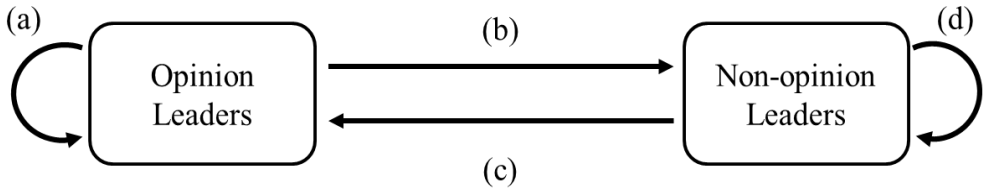

Figure 3: Block Modeling of the Two-Step Flow of Communication

Comparison between flows of information and influence (RQ2)

The network of retweets was formed as a proxy for the flow of influence. Retweeting is rebroadcasting others' Tweets with attribution for the purpose of spreading the messages to one's followers (Barash & Golder, 2010). Social implications of retweeting have been highlighted in previous studies, concluding that the act of retweeting demonstrates public agreement with someone and validation of others' opinions (boyd, Golder, & Lotan, 2010; Parmelee & Bichard, 2011); this indirectly represents the credibility and reputation of the person retweeted (Recuero et al., 2011). While retweeting shows the influence of the retweeted, it also could be possible to

paradoxically retweet messages with which one does not agree. This use of retweeting was filtered by reading the message retweeted, i.e., by considering the context.

The network was formed between the person who retweeted a message and the author who originally created the message.[13] For instance, in the following Tweet message, a retweet network was formed between the retweeter → the retweeted (i.e. the original author) such as HummyMom → blu62, togater → blu62, and yhsgmo → blu62.[14] The message below was retweeted several times. Once a message of blu62 is retweeted, it is distributed to the followers of the retweeter. In this sense, the act of retweeting shows the public endorsement of blu62's opinion, which connotes the flow of influence between blu62 and those who retweeted blu62's message.

[13] It was empirically confirmed that people usually cite original sources in retweeting (Cha et al., 2010).

[14] The retweet network did not include the tie of HummyMom-togater, HummyMom-yhsgmo, or togater-yhsgmo. Some may speculate that togater or yhsgmo might have played a role to revive millionocracy's Tweet message and HummyMom might be affected by either togater or yhsgmo. However, considering that this is not a widely opened Twitter space but a community where participants are well exposed to each other's remarks, the role of intermediaries might not have as much impact as they might have in the general Twitter environment where Tweets rise and disappear fast in the flood of messages. Moreover, Oh and Nguyen (2010) pointed out problems of including intermediaries in building retweet networks and proposed to consider relationships only between the user who retweets a message and the author of that message in order to measure influence with retweet networks. This approach has been made in several studies that examined retweet activities in Twitter (e.g. Conover et al., 2011; Tinati, Carr, Hall, & Bentwood, 2012; Van Liere, 2010; Yang, Sun, Zhang, & Mei, 2012).

> HummyMom RT @togater: RT @yhsgmo: RT @blu62: Whether or not the candidate Um Kiyoung was aware of the illegal election campaign, he should take the responsibility for violating the rule.[15]
>
> Note: Translation from Korean to English is provided by the author. The original is provided in the footnote.
>
> Source: Twitaddons.com

Not only does the act of retweeting a message several times indicate the flow of influence from the retweeted to the retweeter, but also the comments added to the retweeted message clearly show the public validation of the message, for instance the phrase "I do agree with this idea" in the following message.

> sigolsonye I do agree with this idea,, so what is the response from Japan? RT @rockminater: It seems to be very desirable to establish an ocean research station at Dokdo Island. I think now we need to proceed doing seabed exploration around the island.[16]
>
> Note: Translation from Korean to English is provided by the author. The original is provided in the footnote.
>
> Source: Twitaddons.com

The number of nodes in retweet networks was 96 for People's Command and 147 for Hope Republic (including participants who were not engaged in retweet activities), which is the same as the number of nodes in mention networks. Given that all retweets

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[15] HummyMom RT @togater: RT @yhsgmo: RT @blu62: 엄기영후보 사전인지여부와 상관없이 책임지는 모습 필요해 보이는군요.

[16] sigolsonye 이거 저두 좋다고 생각합니다,, 그래서일본이 뭐라고 한다지요? . RT @rockminater: #ROKH 독도에 해양과학기지 건설을 추진하는것은 매우 바람직한 일인것 같군요. 이제 나아가서 독도주변 해저탐사도 진행해야 한다고 생각합니다.

included mentions, though not all mentions included retweets, it is possible that the mention network and retweet network were correlated to each other. However, considering that the way of forming the former is different from the latter, and the intention of mentioning is distinguishable from that of retweeting, the two networks might generate different structural qualities.

The comparison between the information network (i.e. mention network) and the influence network (i.e. retweet network) was made by investigating the sub-structures of the two networks. For this analysis, exponential random graph (ERG) models, so called p* models, were employed. The ERG method allows for placing an observed network within a probability distribution of graphs, and tests whether a particular sub-graph in the observed network occurs more or less than expected by chance alone (Robins, Pattison, Kalish, & Lusher, 2007). Since network analysis is based on the relation between nodes, ordinary statistical analysis that assumes independence among observations is not applicable. However, the ERG method considers the dependence between ties, which better fits the characteristic of social relationships (Lusher & Ackland, 2011). This method was implemented by using PNet (Wang, Robins, & Pattison, 2005) which is based on the Monte Carlo Markov Chain (MCMC) maximum likelihood estimation. A parameter in the model is regarded as significant if the absolute value of the parameter estimate is more than twice its standard error (i.e. $p < .05$) (Shumate & Palazzolo, 2010).

By comparing the two networks to random networks, the structural qualities of the information network and influence network can be identified, which leads us to

understand the difference between the flow of information and the flow of influence in online political discussions. Among several sub-structures in PNet, star, alternative triangle, alternative 2-path, and sink/source parameters were selected, guided by relevant studies on information and communication networks (e.g. Lee & Lee, 2012; Uddin, Hamra, & Hossain, 2011; Weber & Monge, 2011) (see Figure 4).

Star parameters including 2-star, 3-star, and alternative star parameters are related to the tendency of centralization in the network: The large number of star parameters in the network implies that the network is centralized on a few actors.

Triangle parameters indicate how much transitivity is embedded in the network. Transitivity here means that if A is a friend of B and B is a friend of C, A and C tend to become friends to reduce psychological strain and maintain the stability of relationship among the three people (Monge & Contractor, 2003). As a result, the more the alternative triangles in the network, the more cliquelike the network tends to be (Snijders, Pattison, Robins, & Handcock, 2006). The alternative 2-path parameter indicates that multiple paths exist between two actors, which implies the presence of intermediaries and the pre-condition of transitive relationships.

The sink/source parameter denotes actors who only have in-links/out-links, which means those who only receive/send mentions or retweets without having any reciprocal ties with others (Weber & Monge, 2011). As depicted in Figure 4, there is no outgoing tie from the sink parameter and no incoming tie from the source parameter.

These parameters included in the ERG models of the present study need to be interpreted together, since they are interdependent within the model (Lusher & Ackland, 2011).

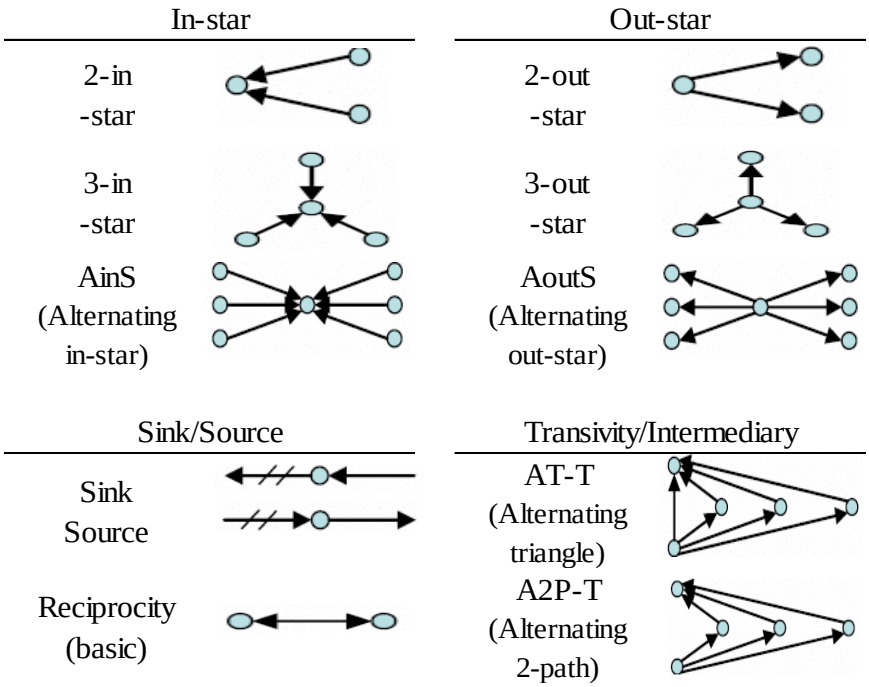


Figure 4: PNet Parameters Included in the Model

Note: The above graphs are adapted from Wang, Robins, & Pattison (2009). In ERG models, arc and reciprocity parameters are included as basic parameters, but the present study only contains the latter. The number of arcs was fixed in conducting model estimation, a method frequently used for large networks that have more than 40 nodes, as in the present study; otherwise, it is unlikely that convergence can be achieved between the estimated model and the observed network (Snijders et al., 2006; Wang et al., 2009).

The ERG models of this study did not include the arc parameter because the number of arcs was fixed in conducting model estimation. This method is frequently used for large networks that have more than 40 nodes[17] as in the current case; otherwise it is

[17] In ERG models, networks that have more than 40 nodes are regarded as large networks.

not possible to achieve convergence between the estimated model and the observed network (Snijders et al., 2006; Wang et al., 2009). In this regards, the model estimation in the present study was conducted by fixing the number of arcs into that which each network possesses. The convergence of the parameter estimation can be checked with a convergence t-ratio: If the t-ratios of all parameter estimates are less than 0.1 in absolute value, it indicates a good convergence (Robins et al., 2007). After achieving convergence, the goodness-of-fit (GOF) of the model should be tested to assess how well the model explains the properties of the observed network and whether it produces the features of the observed network that were not modeled. The model had a good fit if t-ratios of the parameters included in the model are less than 0.1 and those of the other parameters are less than 2 in absolute value. The network data was dichotomized in the whole process of ERG modeling.

Characteristics of opinion leaders (H2-1 & H2-2)

Characteristics of opinion leaders were examined based on the extent of content-creating activities and the frequency of their messages being distributed by others.

Content-creating activities were measured by investigating Tweet messages, authored by the message sender, that contain hyperlinks. Hyperlinks lead the readers to webpages that have further information such as news articles, photos, and video clips. Whether this hyperlinked content was produced by participants of People's Command and Hope Republic or imported from existing sources was investigated by visiting all

hyperlinks embedded in the Tweet messages. In addition, the frequency of messages distributed by others was operationalized into the frequency of messages being retweeted. The more frequently the message is retweeted, the greater influence it is regarded to have on shaping the discussion.

To test the current hypotheses, binary logistic regression analysis was conducted by defining the number of hyperlinks and the frequency of messages retweeted as independent variables and opinion leader / non-opinion leader status as a dependent variable. The number of Tweets posted by each participant in the group discussion was inserted as a control variable. These variables were not subject to a multi-collinearity problem, having variance inflation factors[18] (known as VIF) all less than 2.2.

Diversity of discourse (RQ3-1)

The third research question interrogates the forms, sources, and ideological perspectives of discourse shared among participants in online public fora. The analysis on the forms of discourse was conducted with 'Korean Linguistic Inquiry and Word Count' (K-LIWC) software freely available at http://k-liwc.ajou.ac.kr/. This is the Korean text analysis program developed by Lee, Sim, and Yoon (2005), based on Pennebaker, Francis, and Booth's (2001) English 'Linguistic Inquiry and Word Count' (LIWC). K-LIWC analyzes words in terms of the emotional dimension and categorizes them into positive and negative categories. The positive category includes positive sentiment (e.g.

[18] VIF is an index that detects collinearity among independent variables. If VIF exceeds 10, it indicates the existence of serious multi-collinearity, which calls for correction.

hope, support, contribute, invaluable), positive emotionality (e.g. good, happy, glad, easy), and optimistic/energetic (e.g. enthusiastic, diligent, exciting) variables, and the negative category has negative sentiment (e.g. problematic, aloof, disastrous, damaged), anxiety (e.g. anxious, pressuring, careful), anger (e.g. rageful, contemptuous), and sadness/depression (e.g. lost, sad, gloomy) variables. The cognitive dimension contains causation (e.g. causing, resulting from, fundamental), reflection (reconsidering, learning, wise, self-reflecting), expectation (e.g. possible, again, expecting), limitation (e.g. oblivious, restricting, being unaware of), speculation (e.g. almost, what, rough, guessing), and conviction (e.g. required, urgent, arguing, legitimate) variables. Multiple-coding is allowed in K-LIWC, since a single word can convey, for instance, positive sentiment and optimism at the same time. K-LIWC generates the number of words classified into each variable. For this analysis, 618 Tweet messages are manually entered one by one in K-LIWC software.

Sources of content, which indicate the origin of hyperlinks embedded in Tweet messages, were classified into user-generated content, traditional media, net-based media,[19] government, civic groups, and others, adapted from the classification by Himelboim (2010) (see Appendix 1). User-generated content is sub-divided into video clips, images, and SNS texts. This analysis was assisted with 'Webometric analyst web analysis software.'[20] This software allows for organizing numerous URLs to the domain

[19] Net-based media in the present analysis indicate online journalism that does not simply aggregate content from traditional media sources but creates its own editorial agenda and news reports. In the present study, amn.kr and ohmynews.com are classified as net-based media.
[20] For more information, please see http://lexiurl.wlv.ac.uk/index.html

level such as .com and .net. For instance, a URL 'http://www.nytimes.com/2012/02/26/opinion/sunday/the-oscars-as-looking-glass.html?_r=1&ref=opinion' is transformed into a domain 'nytimes.com.'

For ideological diversity, Freelon (2010) suggests three models of online democratic communication — deliberative, communitarian, and liberal individualist models — and indicative metrics to identify these models in online political discourse. Among these metrics, inter-ideological (deliberative), intra-ideological (communitarian), and non-ideological/personal (liberal individualist) questioning and responses were selected, which allows exclusive categorization of the ideological perspectives embedded in Tweet messages. In the context of the contemporary political culture in South Korea, conglomerates and major mass media outlets[21] as well as the incumbent government are regarded as representing vested interests of the conservative camp (Chang, 2008). Considering that online communities in the present study criticized this conservative hegemony as denoted in their discussions, they can be broadly classified as having a liberal perspective. In this regard, Tweet messages which reflected conservative or moderate ideology were included in inter-ideological category and messages which are aligned to liberal ideology were in intra-ideological category. Messages which did not contain any ideological perspective or did mention facts and personal issues were coded into the non-ideological or personal category.

[21] Major mass media outlets that have been regarded as representing conservative camp in the contemporary political environment of South Korea are *Chosunilbo, JoongAng Daily*, and *Dong-A Ilbo*.

Details of the coding scheme for the manual content analysis on sources and ideological perspectives are provided in Appendix 1. The level of measurement is a website domain for sources of content and a Tweet message for ideological perspectives. Each Tweet message can be composed of several sentences or several words. Based on the coding scheme, two coders including the researcher conducted the coding, and the inter-coder reliability was tested on a subsample of 60 Tweet messages randomly selected. The inter-coder reliability was measured using Scott's *pi* (1955) which is well-known as a conservative index (Lombard et al., 2002) and has been widely used in communication studies (e.g. Himelboim, 2010; Matthes & Kohring, 2008; Meyers, Brashers, & Hanner, 2000) to measure nominal variables with two coders. Scott's *pi* was calculated by using ReCal2 developed by Freelon (2005). In the present study, it was .85 for sources of content and .82 for ideological perspectives of content, all achieving an acceptable level[22] (Lombard et al., 2002). Coding conducted by the second coder, who was not the researcher, was used for the analysis.

For co-word analysis, KrKwic (Korean Key Words In Context) (Park & Leydesdorff, 2004) was used to analyze the occurrence frequency of words and the connections between these words. Based on this relationship of words, which was generated as a [word x word] matrix, CONCOR (CONvergence of iterated CORrelations) analysis was conducted with UCINET 6.0. This procedure runs numerous correlations between nodes and partitions these nodes into blocks with similar structural equivalence

[22] The acceptable level of inter-coder reliability coefficient is .80 in most cases and sometimes .70 in exploratory studies (Lombard et al., 2002).

(Hanneman & Riddle, 2005). Through CONCOR, clusters of words correlated to each other were created. The present study employed words that appeared more than five times in the discourse for co-word analysis to increase the readability of the graph.

Emotional and cognitive forms of discourse (H3 & RQ3-2)

The social influence of emotional and cognitive content was examined based on the coding of the forms of discourse described above. The social influence of discourse was operationalized into the retweetability of a message: The more frequently the message is passed along, the greater social influence the message has. Thus, the dependent variable is the frequency of being retweeted per message. Given that the dependent variable is count data and has an over-dispersion problem,[23] negative binomial regression analysis was conducted to examine the effects of emotional and cognitive variables on the frequency of messages retweeted. The group variable was included in the regression model in order to control the difference between People's Command and Hope Republic. These variables did not exhibit multicollinearity, having VIFs all around 1 and 2. Nagelkerke's R^2, a modified version of the widely used Cox and Snell's R^2, was calculated as a proxy of R^2 in ordinary least squares regression analysis.

[23] The standard deviation of the dependent variable (1.576) was greater than the mean (0.71). The frequency of messages being retweeted varied from zero to 22.

Interaction with the e-government outlet (RQ3-2)

To ascertain how often the online group for political discussion interacts with the government, the frequency of cross-mentioning between @bluehousekorea and the two online groups was explored. The frequency of cross-mentioning indicates how often @bluehousekorea appeared in the discussions of online groups and how often group members' accounts showed up on the Twitter page of @bluehousekorea. Additionally, the ego network of @bluehousekorea was visualized based on mentions exchanged in order to see with whom @bluehousekorea had conversation, and the content of conversation was also visualized in terms of the occurrence frequency of words appeared in Tweet messages.

Overall, network analysis was conducted by using UCINET 6.0 (Borgatti, Everett, & Freeman, 1999) and the networks were visualized by either NetDraw in UCINET 6.0 or NodeXL (Smith, Milic-Frayling, Shneiderman, Rodrigues, Leskovec, & Dunne, 2010). Ordinary statistical analysis was operated with SPSS 19.0 and R 2.13.1.

Chapter 4: Research Results

NETWORK ASPECTS (FLOW OF INFORMATION)

Concentration, inclusiveness, and equitability of the discussion network (RQ1)

The structure of the discussion network was measured with the gini coefficient, inclusiveness index, and equitability index (see Table 5). The gini coefficient of both People's Command and Hope Republic was close to one, which indicates high inequality. This result implies that discussions were not joined by many people, but were led by just a few individuals. In terms of inclusiveness, more than 85% of both group members who posted Tweet messages during the study period participated in discussions with others. This result also implies that less than 15% were isolated from the discussion. In addition, the Kendall's Tau correlation between out-degree and in-degree was not statistically significant in both groups, but the negative sign of their correlation coefficients indicate that people who contributed more to the discussion were not likely to get more attention by receiving mentions from others. Overall, the discussion networks of the two groups tended to be centralized and inclusive without having conclusive indication of equitability.

	People's command	Hope republic
Gini coefficient	.990	.993
Inclusiveness	.875	.864
Equitability	-.031	-.056
(*p* value)	(.722)	(.432)

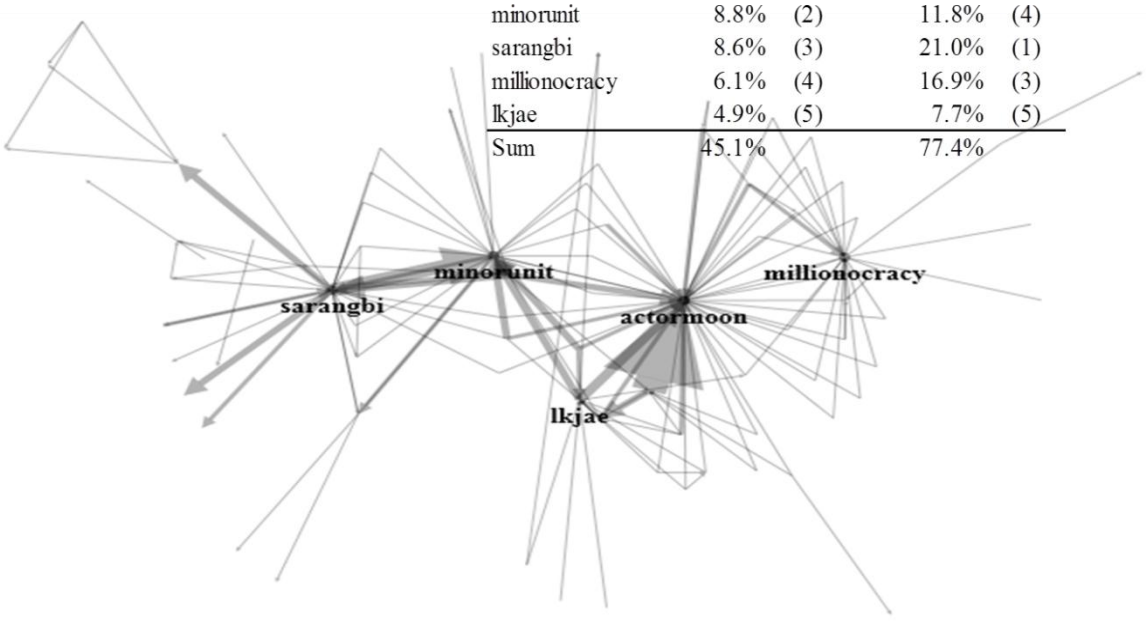
Table 5: Characteristics of Discussion Network Structures

Presence of the two-step flow of communication (H1)

As defined in the present study, five opinion leaders were identified by rank-ordering all participants in terms of degree and flow betweenness centralities. We did not arbitrarily decide the top five to be opinion leaders, but it turned out to be five people who consistently ranked top five in both degree and flow betweenness centralities (see Appendix 2). The network positions of those top five in both centrality measures are visualized in Figure 5. In both groups, the five opinion leaders accounted for over 40% of degree centrality and over 70% of flow betweenness centrality, which implies their strong presence of leading discussions and controlling the flow of information.

People's Command

	Degree	(Rank)	Flow betweenness	(Rank)
actormoon	16.7%	(1)	20.0%	(2)
minorunit	8.8%	(2)	11.8%	(4)
sarangbi	8.6%	(3)	21.0%	(1)
millionocracy	6.1%	(4)	16.9%	(3)
lkjae	4.9%	(5)	7.7%	(5)
Sum	45.1%		77.4%	



Hope Republic

	Degree	(Rank)	Flow betweenness	(Rank)
blu62	17.8%	(1)	25.9%	(1)
h_chief	8.7%	(2)	12.2%	(3)
sigolsonye	5.8%	(3)	9.3%	(4)
chposthy	4.7%	(4)	14.8%	(2)
daesabu	4.0%	(5)	7.8%	(5)
Sum	40.9%		70.1%	

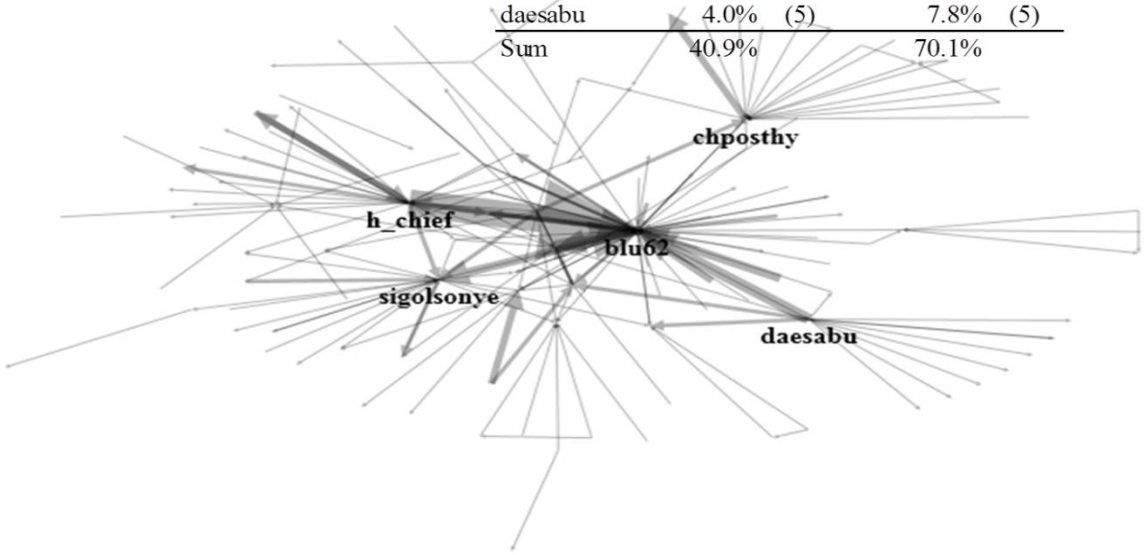


Figure 5: Opinion Leadership in terms of Degree and Flow Betweenness Centralities

Note: Degrees were symmetrized into maximum values. Diagonals and isolates were removed from the graphs.

The block model of opinion leaders and everyone else, i.e., non-opinion leaders, shows that non-opinion leaders had the lowest probability of exchanging information with one another (.004 for People's Command, .003 for Hope Republic), but had a higher inclination to communicate with opinion leaders (i.e. sending mentions to and receiving mentions from opinion leaders) (see Figure 6). Non-opinion leaders had a stronger tendency to talk to opinion leaders (i.e. sending mentions to opinion leaders) (.310 for People's Command, .125 for Hope Republic) than vice versa (i.e. receiving mentions

from opinion leaders) (.040 for People's Command, .094 for Hope Republic). These differences in block densities were statistically significant, and the overall model accounted for over 10% of the variance in the mention network, thus providing support for H1.

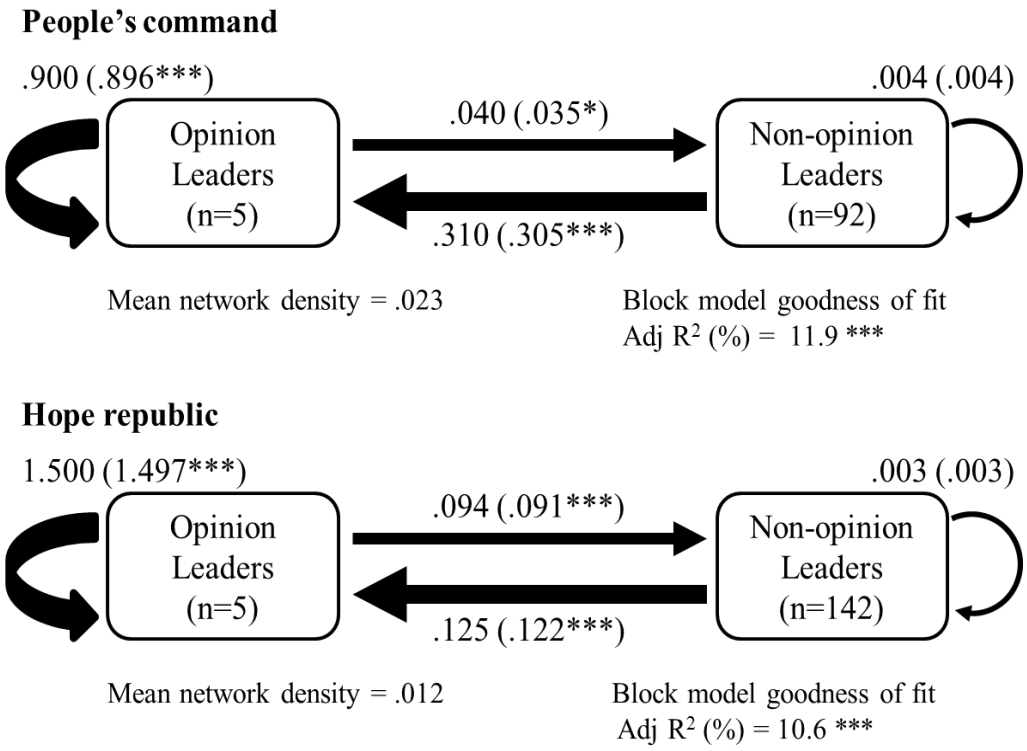


Figure 6: Block Model of the Two-Step Flow of Communication in terms of Block Density

Note: ( ) is the unstandardized coefficient of a regression model with the [non-opinion leaders x non-opinion leaders] block as the reference category.

The alternative explanation of this result might be the preferential attachment mechanism (Barabâsi, Jeong, Néda, Ravasz, Schubert, & Vicsek, 2002), so-called the

rich-get-richer phenomenon, which explains that the high [opinion leaders x opinion leaders] block density and [non-opinion leaders x opinion leaders] block density resulted from the high visibility of opinion leaders who drew more attention than others in the discussion network. While the preferential attachment mechanism provides a good explanation of the emergence of high-degree nodes in the network, it fails to explain why the [opinion leaders x non-opinion leaders] block had greater density than the [non-opinion leaders x non-opinion leaders] block: If the relationship between opinion leaders and non-opinion leaders was governed by preferential attachment, the [opinion leaders x non-opinion leaders] block should have had the lowest block density, which was not seen as such in the present analysis.

In this regard, this study reached the conclusion that the two-step flow of communication took place in online discussions of both People's Command and Hope Republic, having opinion leaders who mediate the information-abundant environment.

Difference between the flow of information and the flow of influence (RQ2)

The sub-structures of information and influence networks, i.e. the mention and retweet networks, were examined through the ERG modeling (see Table 6). The models of both mention and retweet networks had a good fit, having t-ratios of model parameters below 0.1, and those of other parameters all fall below two in absolute value (see Appendix 3). In both mention and retweet networks of People's Command and Hope Republic, AT-T and A2P-T parameters were not significant, which indicates that the

triadic structure did not appear more frequently than chance predicts. Considering the positive signs of the estimates, there was a weak, though non-significant, tendency to form connections between the two who share mutual friends. We can interpret this as saying that both the mention and retweet networks were not significantly cliquish, and participants who played a role as intermediaries were not significantly present, compared to random networks. The other commonality of the two networks was the countervailing directionality between the 2-out-star and higher-order out-star parameters: The sign of the 2-out-star parameter was positive, whereas those of the 3-out-star or AoutS were negative, which means that the observed networks had 2-out-star more and 3-out-star/AoutS less than predicted by a random distribution. These results indicate that people mentioned or retweeted others, but only a few rather than many.

Setting aside this common tendency, a greater number of in-star parameters (2-in-star, AinS) were significant more than in the mention network than in the retweet network for both People's Command and Hope Republic. Mention network had a higher tendency of centralization than expected for random networks. Centralization can result from degree effects and triangulation effects: Degree effects take place when a few, popular nodes attract the larger number of degrees, and triangulation effects occur when a core in the network is composed from overlapping triadic relations (Robins et al., 2007). Considering that triadic parameters (AT-T, A2P-T) were not significant and in-star parameters (2-in-star, AinS) were, the centralization tendency in mention network is explained by degree effects, i.e., having a few participants who were frequently mentioned by many others. In addition, sink and source parameters were significant in

the mention network, whereas they were not significant in the retweet network. The mention network had a larger number of sinks than expected by chance. This means that some individuals did not maintain reciprocal relationships with others, by only receiving mentions and not replying them back. Sources that do not receive any feedback but send out mentions were less likely to exist in the mention network than would be predicted by chance alone.

		Mention				Retweet			
	Parameters	Estimate	(SE)		Conver-gence statistics	Estimate	(SE)		Conver-gence statistics
People's Command	reciprocity	2.17	(.63)	*	-.05	-.12	(1.42)		-.01
	2-in-star	.10	(.02)	*	.06	.22	(.08)	*	.03
	2-out-star	1.24	(.58)	*	-.01	8.34	(1.42)	*	-.01
	3-in-star	.00	(.00)		.06	-.01	(.01)		.04
	3-out-star	-.13	(.10)		.02	-2.36	(.62)	*	-.01
	sink	4.57	(.91)	*	.01	-1.20	(1.30)		-.04
	source	-3.03	(.93)	*	.05	2.34	(1.26)		-.01
	AinS	2.86	(.50)	*	.03	.83	(.72)		.00
	AoutS	-3.57	(1.24)	*	-.03	-8.72	(1.51)	*	-.01
	AT-T	.20	(.11)		.07	.40	(.32)		.02
	A2P-T	-.03	(.02)		-.07	.04	(.03)		.03

		Mention				Retweet			
	Parameters	Estimate	(SE)		Conver-gence statistics	Estimate	(SE)		Conver-gence statistics
Hope Republic	reciprocity	2.24	(.39)	*	-.06	1.76	(.62)	*	.01
	2-in-star	.18	(.04)	*	.02	.14	(.08)		-.01
	2-out-star	.98	(.18)	*	.01	2.12	(.74)	*	.07
	3-in-star	-.01	(.00)	*	.03	-.01	(.00)		-.01
	3-out-star	-.08	(.02)	*	.02	-.34	(.13)	*	.10
	sink	2.43	(.64)	*	-.02	.57	(.99)		-.03
	source	-.31	(.62)		-.03	1.06	(1.03)		.01
	AinS	1.39	(.40)	*	-.03	1.56	(.66)	*	.04
	AoutS	-2.00	(.66)	*	.00	-2.14	(1.59)		.03
	AT-T	.10	(.12)		-.06	.03	(.20)		.04
	A2P-T	.00	(.02)		.00	.08	(.04)		.03

* $p < .05$

Table 6: Results of PNet Estimation

Note: Since the number of arcs was fixed in conducting PNet estimation, the ERG models of this study do not include the arc parameter. Detailed explanation for this procedure is provided in section d. Analysis Plan of Chapter 4.

Although the direct comparison between mention and retweet networks was not available in the current analysis, the difference in structural properties of the two networks compared to those of random networks allowed this study to extrapolate as follows: The flows of information and influence were less likely to be transitive and mediated. Only a few participants were referred to and retweeted by others. The flow of information had star-based, centralized connections which were more salient than those in the flow of influence. The significant presence of sinks in the mention network could be another indication of centralization. These findings were also supported by the network centralization index of the overall graph level: The in-degree mention network (45.0% for People's Command, 23.9% for Hope Republic) had lower network centralization than the in-degree retweet network (25.6% for People's Command, 18.8% for Hope Republic).

Opinion leaders as the influentials (H2)

As descriptive statistics in Table 7 show, opinion leaders compared to non-opinion leaders created a larger number of hyperlinks, had a higher frequency of their messages being retweeted, and had a greater number of Tweets on average, although the standard deviation of each variable was large. These differences between opinion leaders and non-opinion leaders were examined by the binary logistic regression.

	Opinion leader		Non-opinion leader	
	Mean	(SD)	Mean	(SD)
Number of hyperlinks	2.80	(4.962)	.12	(.980)
Frequency of messages being retweeted	25.20	(18.570)	.38	(1.425)
Number of Tweets posted in the group	18.10	(15.103)	1.88	(3.396)

Table 7: Descriptive Statistics of the Characteristics of Opinion Leaders and Non-opinion Leaders

The result suggests that those whose messages were frequently retweeted were highly likely to be opinion leaders (see Table 8). However, the number of hyperlinks was not a significant factor distinguishing between opinion leaders and non-opinion leaders, although the positive sign of the coefficient implies that the former tended to create content more than the latter. These results were produced after controlling the number of messages posted in the group, which showed that opinion leaders posted a greater number of Tweets than those who were not opinion leaders. The regression model was significantly different from the intercept-only model, showing a good fit for the observed data.

Predictor	Coefficient	(SE)
Number of hyperlinks	.083	(.228)
Frequency of messages being retweeted	.421	(.132) **
Number of Tweets posted in the group	.155	(.060) *
(Constant)	-6.185	(1.230) ***
Model $\chi 2$	64.492***	
N	243	

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 8: Results of Binary Logistic Regression Predicting Opinion Leadership

Note: This analysis includes both People's Command (*N*=96) and Hope Republic (*N*=147).

Overall, although opinion leaders are assumed to have better digital skills to create content, the content creation factor was not significant enough to discern opinion leaders from non-opinion leaders, thus rejecting H2-1. Considering the ERG results that the retweet network was not centralized as much as was the mention network, not only opinion leaders' but also several others' messages might have been retweeted. However, the frequency of messages being retweeted demonstrated that it was mostly the opinion leaders' messages that were forwarded, providing support for H2-2.

CONTENT

Sources, ideological perspectives, and forms of discourse (RQ3-1)

In terms of the sources of hyperlinked content, half were user-generated content in both People's Command and Hope Republic (see Table 9).[24] Most of the user-generated content was images such as participants' photos and slogans and text messages containing parody and satire written by like-minded fellow citizens. The information from the government was not cited at all by both groups. In addition, information from either traditional or net-based media was rarely shared. These clear tendencies show that participants of online political discussion were interested in what fellow citizens think about, instead of sharing what the government or the media creates.

As for the ideological perspectives, only 10% of messages were inter- or intra-ideological. This result could be an under-estimation of the reality, since messages that explicitly denote ideological perspectives were only coded as inter- or intra-ideological. Among ideologically opinionated messages, those with intra-ideological perspective were present more frequently than those with inter-ideological perspective. Many other messages contained opinions that were not overtly ideological, laments, facts, and personal issues. For instance, messages such as "Is there any public officer who really serves public interest nowadays?" and "Japanese government seems to suffer from incompetence as seen in their attempt to cover up the damage from the explosion of

[24] The other half were mostly in the civic groups and others category. Especially considering that People's Command is a communication platform of a civic group, it is inevitable that the participants of this group frequently referred to that civic group and other related civic groups.

nuclear power plants. Japan is our neighbor country, but I don't like what they are doing now." contained political opinions, but coded as non-ideological.

In regards to the form of discourse, emotional words outnumbered cognitive words in both groups. However, the prevailing valence of emotion was contrary to each other; discourses in People's Command were more negative and those in Hope Republic were more positive. Among negative emotion, anger was more frequently expressed than anxiety in both groups.

For cognitive components, the two groups did not show much difference: Conviction had the highest frequency, and causation the lowest. This result implies that discussions made in the two groups were not analytical, such as exploring causes of certain problems, but rather assertive by expressing strong claims.

		People's Command		Hope Republic		**Total**	
		Frequency	(Ratio)	Frequency	(Ratio)	**Frequency**	**(Ratio)**
Source	User-generated content	37	(49%)	24	(52%)	**61**	**(50%)**
	Video clips	2	(3%)	0	(0%)	2	(2%)
	Images	12	(16%)	17	(37%)	29	(24%)
	Text	23	(31%)	7	(15%)	30	(25%)
	Traditional media	0	(0%)	8	(17%)	**8**	**(7%)**
	Net-based media	2	(3%)	0	(0%)	**2**	**(2%)**
	Government	0	(0%)	0	(0%)	**0**	**(0%)**
	Civic groups	30	(40%)	0	(0%)	**30**	**(25%)**
	Others	6	(8%)	14	(30%)	**20**	**(17%)**
	Total messages	75	(100%)	46	(100%)	**121**	**(100%)**
Ideology	Inter-ideological	0	(0%)	17	(4%)	**17**	**(3%)**
	Intra-ideological	16	(9%)	25	(6%)	**41**	**(7%)**
	Non-ideological/personal	160	(91%)	400	(90%)	**560**	**(91%)**
	Total messages	176	(100%)	442	(100%)	**618**	**(100%)**
Form	Emotional	279	(159%)	1086	(246%)	**1365**	**(221%)**
	Positive sentiment	69	(39%)	428	(97%)	497	(80%)
	Positive emotionality	22	(13%)	235	(53%)	257	(42%)
	Optimistic/energetic	45	(26%)	118	(27%)	163	(26%)
	Negative sentiment	103	(59%)	190	(43%)	293	(47%)
	Anxiety	4	(2%)	18	(4%)	22	(4%)
	Anger	34	(19%)	71	(16%)	105	(17%)
	Sadness/depression	2	(1%)	26	(6%)	28	(5%)
	Cognitive	133	(76%)	613	(139%)	**746**	**(121%)**
	Causation	12	(7%)	57	(13%)	69	(11%)
	Reflection	21	(12%)	108	(24%)	129	(21%)
	Expectation	20	(11%)	99	(22%)	119	(19%)
	Limitation	21	(12%)	92	(21%)	113	(18%)
	Speculation	17	(10%)	112	(25%)	129	(21%)
	Conviction	42	(24%)	145	(33%)	187	(30%)
	Total messages	176	(100%)	442	(100%)	**618**	**(100%)**

Table 9: Content Analyses by Source, Ideology, and Form

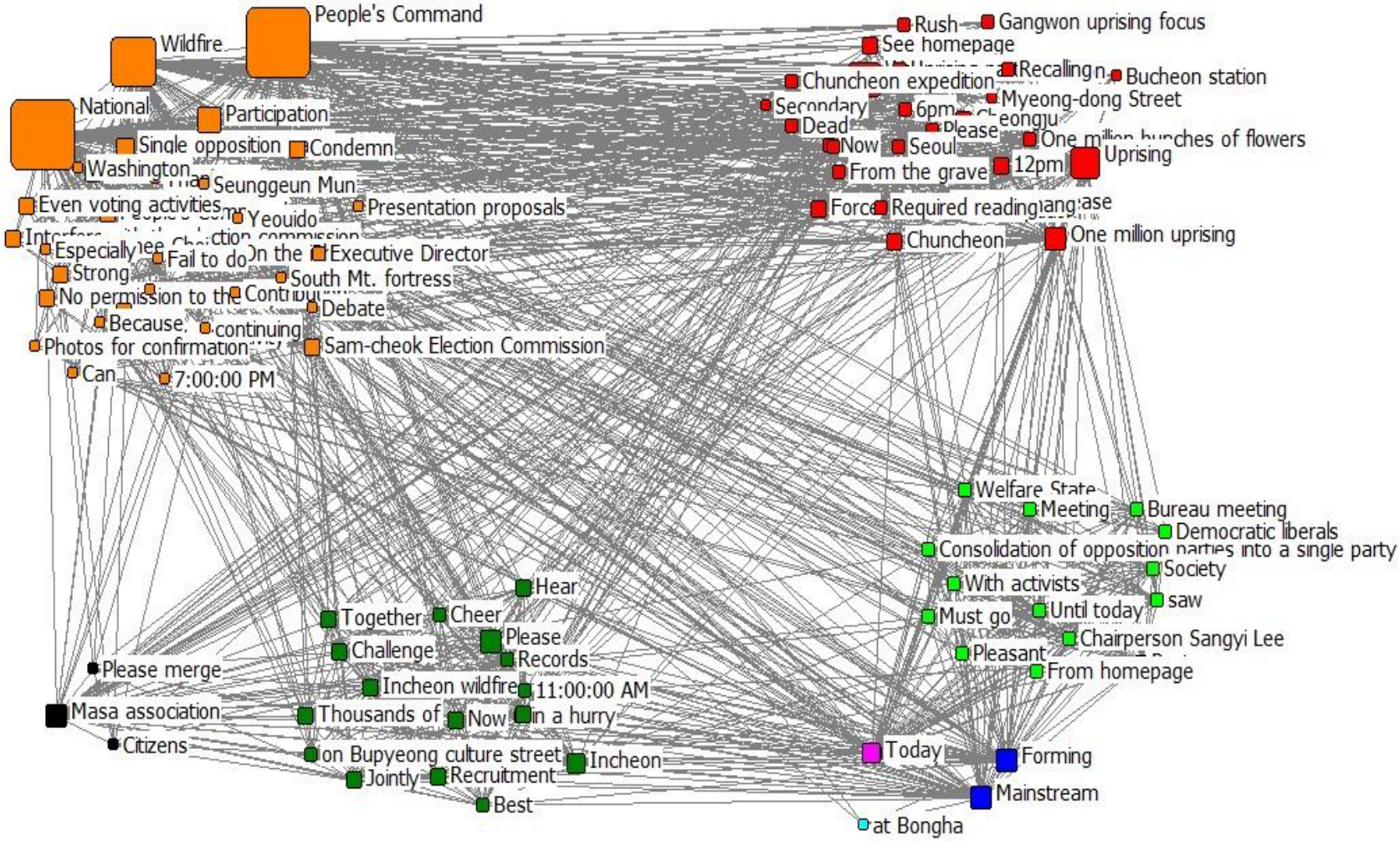
Note: Content analysis of forms was conducted with K-LIWC which allows multiple coding. ‘Others’ category of the sources of hyperlinked content included web portals, online encyclopedia, and broken hyperlinks.

In addition to the content analysis, co-word analysis described the overall discourse generated in the two groups (see Figure 7). People's Command had four main clusters of discourse. The largest cluster colored in orange was about the group itself, the "wildfire" (a shared metaphor of offline gatherings or rallies), and criticisms against the government. The second cluster in red was about rallies taken place in Seoul, Chuncheon, Cheongju, and Gangwon. The other two clusters in lime and in green were about comments written by the chairperson of the Welfare State Society and about recruiting people.

Hope Republic had three main clusters and five other smaller ones. The largest cluster in yellow was about criticizing the government's decision to build a naval base near Gangjung town in Jeju Island, which can cause environmental problems and threaten the livelihood of divers who sell sea creatures, and about asking for donations to help this town. The pink cluster was about asking the group members to support a candidate for the presidential election of Hope Republic. In the black cluster, people were talking about the importance of listening and respecting and supporting themselves. The other smaller clusters cover discourses on the resurgence of the moderate party (blue cluster), problems related to Japan (lime cluster), offline gatherings (green cluster), and requests for participation in the poll (red cluster).

As noted in the content analysis, co-word analysis shows that Hope Republic had emotionally positive words, such as "jubilant," "joy," "good," and "enthusiasm," more than People's Command. The analysis also demonstrates that the discourses in both

groups were focused on their political topics. In addition, name-calling or uncivil words were rarely found in both groups.


People's Command
Wildfire
National
Participation
Single opposition
Condemn
Washington
Seunggeun Mun
Even voting activities
Yeouido
Presentation proposals
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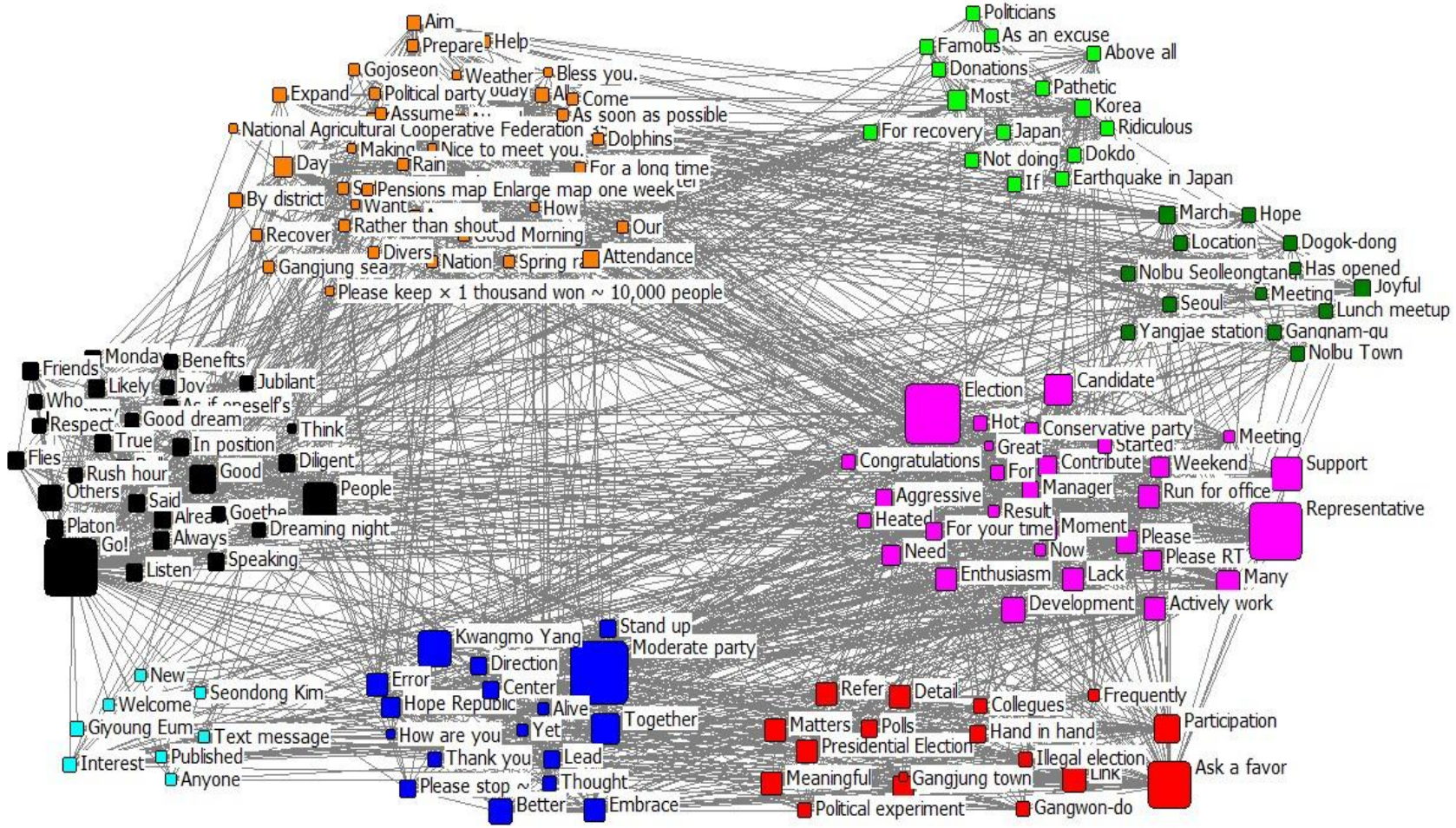

Figure 7: Co-Word Analysis of People's Command (above) and Hope Republic (below)

Note: Nodes were colored based on their group association. The size of nodes indicates the occurrence frequency of a given word. Only words that appeared more than five times in the discourse were included in the analysis.

Influence of emotional and cognitive forms of discourse (H3 & RQ3-2)

The results of negative binomial regression demonstrate that negative emotion accounted for a larger amount of variance in the frequency of being retweeted than positive emotion, as denoted in the incremental change of Nagelkerke R^2 from 0.9% to 4.2% (see Table 10). Thus, discourses with negative emotion were more likely to have social influence than those with positive emotion, providing support for H3-1. Among emotional variables, only anger was a significant predictor of retweetability. A one unit change in the occurrence of words that express anger is expected to produce about 2.5[25] more retweets, while holding all other variables constant. Anxiety, which has been a variable of interest in the literature along with anger, was not statistically significant, but the negative sign of its coefficient suggests that discourses that conveyed anxiety were less likely to be retweeted.

[25] Since the coefficients of negative binomial regression are the logs of expected counts, they need anti-log transformation for interpretation. For anger variable, the coefficient .927 is transformed into 2.527 through exp(.927) = 2.527.

	Emotional				Cognitive	
	Coefficent (SE)	Coefficent (SE)	Coefficent (SE)			Coefficent (SE)
Group	1.114 ***	1.052 ***	1.068 ***		Group	1.068 ***
	(.180)	(.189)	(.191)			(.171)
(Constant)	-.776 ***	-.743 ***	-.850 ***		(Constant)	-.600 ***
	(.107)	(.133)	(.141)			(.117)
Positive sentiment		.025	.034		Causation	-1.477 **
		(.147)	(.145)			(.502)
Positive emotionality		-.210	-.167		Reflection	-.029
		(.178)	(.175)			(.204)
Optimistic/energetic		.166	.148		Expectation	-.939 **
		(.185)	(.186)			(.274)
Negative sentiment			-.147		Limitation	-1.096 ***
			(.173)			(.298)
Anxiety			-.258		Speculation	.030
			(.542)			(.245)
Anger			.927 **		Conviction	.482 **
			(.329)			(.178)
Sadness/depression			-.223			
			(.416)			
Model $\chi 2$	37.360 ***	39.825 ***	51.867 ***		Model $\chi 2$	86.048 ***
Nagelkerke R^2 (%)	14.1	15.0	19.2		Nagelkerke R^2 (%)	30.4
R^2 change (%)		0.9	4.2			
N	478	478	478		*N*	478

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 10: Results of Negative Binomial Regression Predicting Retweetability

Note: Cell entries are coefficients of the negative binomial regression with standard errors in parentheses.

Comparing the emotional form of discourse to the cognitive form, this study found that the latter (30.4%) provided a better explanation for retweetability than the former (19.2%), thus failing to reject H3-2. Among cognitive variables, causation, expectation, limitation, and conviction were all statistically significant. The more the

discourse explained causes and effects, conveyed expectation, or acknowledged limitations, the less likely it was passed along, as denoted by the negative signs of the coefficients. However, when the discourse was filled with conviction, its retweetability increased by 1.6 times[26], ceteris paribus.

For example, the followings are the messages that were widely shared in People's Command (above) and Hope Republic (below):

> There is a meeting with activists of the progressive camp today. I just read the comment written by Mr. Lee, the chair of <Welfare State Society>. We need to proceed with the consolidation of the opposition parties for a single party. The public opinion is increasing.[27]
>
> I support Mr. Yang Gwang-mo. ^_^ Please stand up for the moderate party. The moderate party should stand at the center of Hope Republic and coordinate both conservative and liberal parties in order to make further improvement.[28]
>
> Note: Translation from Korean to English is provided by the author. The original is provided in the footnote.
>
> Source: Twitaddons.com

[26] exp(.482)=1.619

[27]오늘은 사무국회의에 민주진보진영 활동가들과의 모임이 있습니다. 홈피에서 오늘에야 <복지국가 쏘사이어티> 이상이대표의 글을 봤는데 야권단일정당으로 가야한다 대세가 잡혀가네요

[28]양광모님을 지지합니다. ^_^ 중도당을 일으켜 세워주세요~ 중도당이 희망광화국에 중심이 되서 좌.우를 아우르며 함께 더 나은 방향으로 이끌어 갔우면 합니다.

INTERACTION WITH THE GOVERNMENT (RQ3-2)

People's Command and Hope Republic did not have any interaction with @bluehousekorea. They did not send messages to any 138 governmental Twitter accounts. This result shows that even though people had a channel to directly communicate with the government, they did not use it.

The ego network of @bluehousekorea depicts that it communicated with only seven citizens during the study period (see Figure 8). The other users with whom @bluehousekorea interacted were all government agencies such as the Ministry of Education, Science and Technology (@mest4u) and the Ministry of Land, Transport and Maritime Affairs (@Korea_Land) and government projects such as the Four Major Rivers Restoration project (@save4rivers) and One Week for the Earth (@greenweek2011) campaign. The most mentioned Twitter account by @bluehousekorea was the Ministry of Foreign Affairs and Trades (@mofatkr), followed by that of the Prime Minister (@PrimeMinisterKR). Overall, over 70% of interactions were made with government-related Twitter accounts.

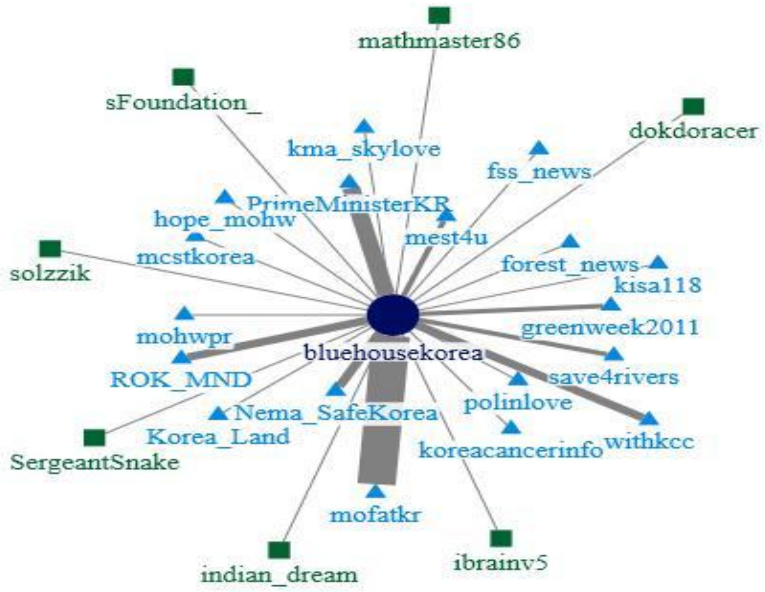

Figure 8: Ego Network of @bluehousekorea

Note: The circle at the center is the Blue House. Blue triangles indicate government agencies and government projects, and green squares denote ordinary citizens. The width of edges is proportionate to the number of mentions sent between @bluehousekorea and the given node.

Many Tweet messages were about introducing new policies, publicizing the government's achievements, and briefing the president's official schedule. This tendency was denoted by echoing what other government agencies announced on Twitter and in words such as "about," "through," "for," "today," and "scheduled to" which appeared in the Tweet messages at least more than five times (see Figure 9). Words such as "we," "all", "everybody's," and "nation" were also frequently used by @bluehousekorea, which implies that the government attempted to convey solidarity or legitimacy in implementing policies.

Messages exchanged with ordinary citizens were about acknowledging the president's warm consideration of the Korean army, asking what types of digital devices the president uses, and encouraging undergraduate students' campaign on Dokdo, the island that is under conflict with Japan in regards to its territoriality. None of them were criticizing the government. In addition, "the President" appeared very frequently in the Tweet messages, which suggests that it was not the President himself who managed @bluehousekorea but his staff members.

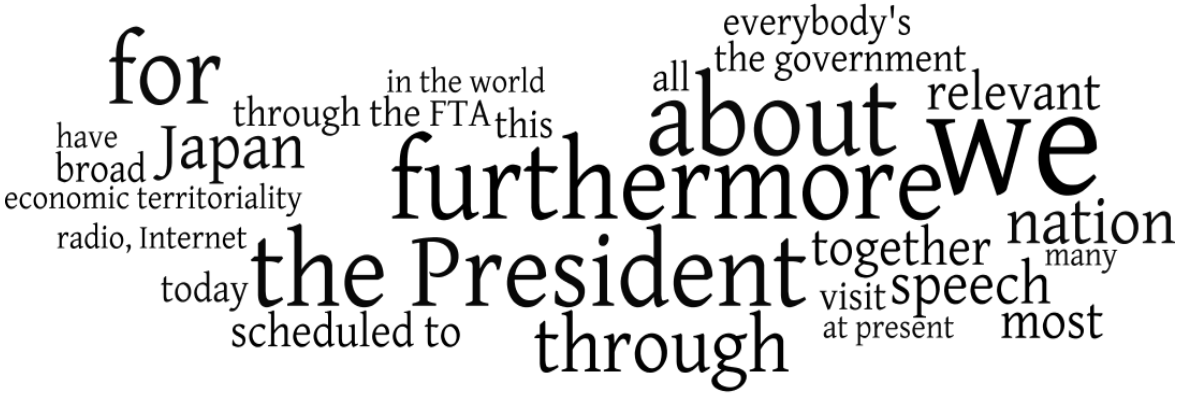

Figure 9: Words Most Frequently Appeared in @bluehousekorea

Note: These words are those that occurred more than five times in @bluehousekorea. The size of the character is proportionate to the occurrence frequency of a given word.

SUMMARY OF THE RESULTS

Based on the cases of People's Command and Hope Republic, the present study examined the structural quality of the flow of information, the content of discussions, and the interaction with e-government outlets.

In terms of the network structure, the discussion network was centralized on a few participants and relatively inclusive in engaging many group members. However, there was no statistical indication of equitability. Each group had five opinion leaders who participated in many discussions and facilitated the flow of information. Interaction between opinion leaders and non-opinion leaders took place more than that among non-opinion leaders, which suggests that the flow of information was subject to the two-step flow of communication from external sources of information to opinion leaders and then to other participants. This flow of information was different from the flow of influence in that the former had more star-based, centralized connections compared to a random distribution than the latter. However, when considering the frequency of messages being passed along, it was mostly opinion leaders' messages that were intensively spread. In this regard, opinion leaders were influentials, but they were not content creators.

In terms of the discourse, sources of information were confined to images and messages created by like-minded fellow citizens, and discussions were more ideologically like-minded than ideologically dissimilar in both People's Command and Hope Republic. Emotional expressions prevailed over cognitive expressions, and anger was more salient than anxiety. With regards to the cognitive process, causation was least employed and conviction was mostly used in the discussion, which suggests that less analytical and more assertive forms of discourse were present in the discussions. Examining the discussion itself, three or four clusters of discourses were revealed in both groups. Close reading of these clusters shows that discussions were not decaying into trivialized and personal talks, but were covering political issues. In addition, emotionally

negative content had greater social influence than positive content, and content with anger was more widely spread than content with anxiety. When the content conveyed the conviction of the author, it was highly shared.

In terms of the interaction with the government, participants of People's Command and Hope Republic did not communicate with either @bluehousekorea or other e-government outlets. Only a few citizens sent @bluehousekorea messages, far from what one might consider to be the practice of citizenship. As noted in the discourse of @bluehousekorea, the government appropriated Twitter as a tool for information transmission, not more or less than that.

Chapter 5: Discussion and Conclusion

RETHINKING THE HABERMASIAN PUBLIC SPHERE IN ONLINE PUBLIC FORA

In 'The Structural Transformation of the Public Sphere' (Habermas 1989), Habermas lamented the degeneration of the public sphere along with the decline in the quality of discourse as a corollary to the increase in the quantity of participation in the public sphere. The wider participation in the public sphere entailed the loss of common ground and split the public sphere into two groups such as minorities of specialists and majorities of uncritical consumers. Habermas argued that this transformation has led to the decay of the public sphere into an arena for advertising by states and corporate actors and into the domination of party politics, rather than rational and critical debate by the public (Calhoun, 1992).

Based on the results of the present study, online public fora as exemplified by People's Command and Hope Republic were far from the Habermasian public sphere. Instead of the free flow of information from many to many as enabled by the development of information and communication technologies, the flow of information was between a few and many. A few individuals identified as opinion leaders were influentials whose remarks were highly passed along by others. Discussions were based on like-minded sources, more intra-ideological than inter-ideological, and more emotional than cognitive. Rather than analytical, causal discourses, discourses that convey conviction or anger were prevalent. From the Habermasian perspective, these online public fora were not egalitarian and instead were simply filled with low-quality

and emotional discourses of like-minded people, confirming the degeneracy argument above.

However, before making an assertion that the public sphere is in decline, can one consider that the form of the public sphere has been transformed from what Habermas defined? Loader and Mercea (2011, p.760) argued that "the Habermasian model was incongruent with the contemporary political and social culture of many societies." Unlike 17th and 18th century European society, in the contemporary era a large number of people, whether or not they share similar socioeconomic status, have political conversations in the virtual space. The community structure has been transformed from a 'little box' bound to local neighbors, to 'glocalization' connecting long-distance relationships, and finally to 'networked individualism' freed from geographical restriction (Wellman, 2002). Networked individualism has led to the emergence of the networked public sphere where the public has more interpersonal relations and more communicative power than before.

This change has implications for the potential of online public fora as a public sphere or many delimited public spheres. First, compared to the historical public sphere, the enhanced communicative power contributes to the increasing communicative reflexivity that Habermas argued is a main constituent of the public sphere (Friedland et al., 2006). In the present study, participants of online public fora distributed others' comments and added their opinion to that of others. During this process, discussions

neither digressed from politics nor degraded to small talk, as visualized in the clusters of discourses shared in the online public fora.

Second, increased "traversability" — easing the transition between reading news media and joining online public fora — can also be regarded as another aspect of online public fora likely to constitute the public sphere (Brundidge, 2010b). In the current case, the hyperlinked content embedded in messages helped participants to traverse different sources and modes of communication.

Third, online political discourse moves through the viral capability of the technology, and this daily civic engagement sometimes accompanies a massive repercussion from the public and entails institutional responses (e.g. Strover & Choi, 2012). Participants of People's Command and Hope Republic passed along messages with which they agreed and attempted to form public opinions, not only within the group but also outside the group.

Lastly, as noted by Dahlgren (2005), online public fora have increased civic interaction and fostered civic cultures. Satire and parody in the form of either text messages or audio-visual content were frequently shared in online public fora, as in the cases of present study. This sharing of non-rational but emotional content can make people feel more knowledgeable about politics and contribute to increasing political participation (Hoffman & Young, 2011). Moreover, according to the citizen communication mediation model (Shah et al., 2005) and O-S-R-O-R model (Cho et al., 2009), online political discussion promotes political knowledge and participation.

Considering the growing political apathy in the contemporary era, online public fora, especially based on SNSs, can increase the accessibility of ordinary citizens to political discourse and garner their attention to politics.

Based on the research results, the characteristics of the networked public sphere are illuminated through the comparison with the Habermasian public sphere in Table 11.

	Habermasian public sphere	Networked public sphere
Form	• Face-to-face discussion • Bourgeois (male, white, rich) • Geographically bounded participation • Courteous turn-taking in expressing opinions	• Mediated discussion via online • Anybody (who have access to the technology and skills to join online fora) • Less restriction on participation with less temporal and spatial constraints • Presence of a few individuals who contribute to a large portion of discussion • Communicative reflexivity of reminding and referring to others' opinions • Traversability of easing reading news and joining participation • Viral capability of the technology to broaden the basis of support and form public opinions
Substance	• Rational-critical discourse • Formal speech • Appeal to the reason • Literary production as a source or subject of discussion • Diverse opinions • Authoritative criticism by bourgeois which draw attention from the State • Promotion of "high" culture • Deliberative democracy	• Emotional/expressive discourse • Informal expression such as parody and satire • Appeal to the emotion • Fellow citizens' opinions as a source or subject of discussion • Like-minded opinions • Negligible attention from and responsiveness of the government. Instead, participants as ordinary citizens attempt to form public opinions or actively participate in voting to indirectly influence policy-making decisions. • Promotion of civic cultures • Participatory democracy

Table 11: Habermasian Public Sphere vs. Networked Public Sphere

Being obsessed with the Habermasian notion of the public sphere, we tend to disregard other modes of communication except deliberation and have blind faith in rationalization. Habermas's viewpoint is based on the proposition that "every 'competent speaker' should participate, rather than every possible one" (Neuman, Bimber, & Hindman, 2011). Contrary to Habermas, Bryce (1888) argued that sentiment, rather than reasoning, can contribute to making the 'right' political judgment. This might be one of the reasons that political communication research started to pay attention to emotions. The dark side of deliberation also was found by Mutz (2006), who observed that people having cross-cutting exposure to different opinions tended to participate less in politics than people having selective exposure to homogeneous opinions. By acknowledging that rational deliberation is not the only means to constitute the public sphere and achieve democratic ends such as civic engagement, social capital, and feelings of community, we can expand the theoretical usefulness of the concept "public sphere."

> Although deliberative theory is full of inspiring and promising ideas, researchers should be under no obligation to "make it work" if the conditions under which it is beneficial turn out to be rare. If there is an easier, more efficient way to achieve some of these same ends, scholars should be open to these possibilities (Mutz, 2008, p.529).

Why, then, at this particular moment, is the rethinking of the public sphere important? Numerous large and small online public fora, such as People's Command and Hope Republic, are created to share thoughts and express voices on specific topics, which can be theorized as "accelerated pluralism" (Bimber, 1998). This phenomenon has been explored in the context of social movement theory (Della Porta & Diani, 2006) or online activism discourse (McCaughey & Ayers, 2003), which basically frames online political

activities as temporary incidents rather than a daily continuity. The every-day political discussion on the Internet is subsumed under the process of online activism and has not yet garnered much significance. This might be because, from the Habermasian perspective, online public fora are not public spheres but simply public spaces.

However, based on the research results, online public fora are not public spaces where everybody can make a rant and which are not conducive to democratic process and only function as emotional ventilation, although they do not constitute deliberative public spheres. In these online public fora, the credibility of the message itself was considered important; cognitive discourses had greater social influence than emotional discourses; discussions were not trivialized to personal talk; and uncivil words were rarely stated. Different from the deliberative public sphere grounded on the information-based citizenship, online public fora are another form of public spheres premised on the notion of the rights-based citizenship. Schudson (1992, p.49) argues that ″our use of digital media may be imprisoned by a concept of democracy that is a century old.” If the public sphere embraces not only ‘rational deliberation’ but also ‘emotional remarks’ (not including name-calling and uncivil remarks), if the public sphere favors not only ‘elite discourse’ framed by mass media but also ‘grassroots opinions’ in online fora, and if the public sphere is grounded not only on ‘deliberative democracy’ but also on ‘participatory democracy,’ the potential of online public fora might gain attention.

The distinctions between “deliberative public spheres (or deliberative democracy)” and “expressive public spaces (or participatory democracy)” seem to be arbitrary, since

these two intermingle with each other in reality. Habermas simply posits a multiplicity of ideas and critiques proposed by individuals in the public sphere, but, in reality, there are underlying social struggles to draw public attention to the matters of concern against the dominant ideology or hegemonic powers that mostly take advantage of framing public discourse (Calhoun, 1992). As a result of these struggles, people can get their agenda on the table for further political discourses and decisions. In the present study, participants of online public fora passed along like-minded messages mostly written by opinion leaders. This activity can be regarded as partisan but contributes to deliberation by increasing the input of ideas and opinions in the public sphere of many public spheres. This inseparable relation between deliberative and participatory democracy needs to be considered in a re-conception of the public sphere, which embraces not only rational-critical deliberation in a formalized environment but also expressive discourse in informal, online fora; both should be regarded as legitimate components of a public sphere.

The negligible interaction between online public fora and the e-government outlet in the present analysis might have stemmed partly from relegating online public fora to a status as a public space rather than a public sphere and from using social network tools by the government for information transmission rather than civic interaction. Instead of human interaction between ordinary citizens and public authorities, *media* interaction between citizens and e-government outlets was facilitated. Recently, acknowledging the power of online political discourse, many politicians have established online channels to inform and communicate with their constituents. Regarding online public fora as a public

sphere to interact with citizens, not as a public space to uni-directionally transmit information, online public fora in theory can increase the responsiveness of representation by making greater voices in the agenda.

> In the arena of new politics, the Internet becomes not only relevant but central: It is especially the capacity for the "horizontal communication" of civic interaction that is paramount. (Dahlgren 2005, 155)
>
> As a complementary way to analyze and understand political interaction in online public spheres, I propose that we treat political discussion not just in terms of its rational communicative qualities, but also as a form of practice integrated within more encompassing civic cultures. (Dahlgren 2005, 157)

As supported by several scholars (Dahlgren 2005; Shah et al. 2005), perhaps, it is not the nature of the discussion but the discussion or interaction itself that might be important for having lively public spheres.

In order to reduce the incongruence between the theory and the reality, this study proposes we re-consider the public sphere as a realm in which both deliberative and participatory democracy and both deliberation and emotional expression co-exist. Starting from here, we can find a way to develop the functioning of online public spheres as a bridge between civil society and institutions, rather than relegating them to the status of decayed echo chambers perturbing the democratic process.

IMPLICATIONS OF THE STUDY

This section provides theoretical implications in the two-step flow of communication theory and selective exposure theory, methodological implications of

structure/context, multi-level, and quantitative/qualitative approaches, and practical implications of e-government development.

Theoretical Implications

Two step flow of communication theory

The two-step flow of communication had once lost its luster because of the difficulty of empirically testing the theory in a political communication context and because of the technological development that enabled messages to be sent directly to the target audience without any social mediation. The latter phenomenon was hypothesized as the one-step flow of communication by Bennett and Manheim (2006) who speculated on the demise of the two-step flow theory. However, several scholars (Mutz & Young, 2011; Thorson & Wells, 2012) envisioned the resurgence of the two-step flow of communication in SNSs, which was observed in the present study. This study identified the two-step flow of communication in online public fora with the presence of opinion leaders. What is different from the traditional theory that posits the flow from mass media to opinion leaders and then to lay people is that it is not only the mass media but external information sources, including the Internet and content produced by fellow citizens, that were engaged in the flow of information.

Along with the flow of information, the flow of influence was another issue that stemmed from the two-step flow theory. Katz and Lazarsfeld (1955) discussed "personal influence" without considering that influence and information might not always go

together. Seeing this lacunae, the current study examined the two and found that the flow of information was likely to be more centralized around a fewer individuals than the flow of influence, by comparing each of these two to random distributions. This result is different from what could be expected from the literature. Inspired by the previous studies that people retweet those whom they regard as reliable and credible (Recuero et al., 2011), the influence network could be more centralized than information network; this turned out not to be supported in the current analysis. This somewhat counter-intuitive result is understandable if influence comes from not the reliability or credibility of an individual but that of retweeted messages and if information is exchanged with an individual whom one considers familiar and well-known as information sources. Both networks were not significantly cliquish compared to random networks, which means they were less likely to be closed or fragmented into small cliques.

Opinion leaders were found to have social influence by having their messages spread by others. Their messages were frequently retweeted, which means that they were shared not only by participants of People's Command and Hope Republic but also by the followers of these participants. Opinion leaders' social influence supported by technological affordance (the network) allowed the leaders to have greater power in forming and informing public opinions. However, opinion leaders were not media themselves. Even though technologies support them to create content by themselves, they

were not engaged in content creating activities significantly more than expected by chance.[29]

Selective exposure

In the literature, there were mixed findings in regards to the selective exposure phenomenon, one supporting Sunstein's (2007) echo-chamber argument, the other finding online inadvertent encounters with dissimilar opinions. The results of the present study are in line with the former, considering that the sources and ideological perspectives of the content were tilted to one side, although this does not necessarily mean that participants intentionally avoid conflicting content (Garrett, 2009). The prevalence of like-minded content might exist partly because the current analysis was based on discussions made within a group despite the group's openness to everybody, as well as because the phenomenon of selective exposure to congenial opinions is more common than that of intentional avoidance to dissimilar opinions.

In addition, emotional reaction appeared to be related to the perception of the hostility in the online environment. While negative emotion was prevalent in People's Command, positive emotion was more common in Hope Republic, which reminds Ragsdale's explanation (1991) that one's emotional valence is related to one's perception of the environment; Positive emotion stems from one's successful control of the environment, whereas negative emotion arises from the threat in the environment.

[29] Content created by opinion leaders was, for instance, lengthy text messages asking opinions of participants, notifications of offline gatherings, and video clips of these gatherings.

Considering that the People's Command argued for the consolidation of the opposition parties against the ruling party, they might feel the political environment to be hostile, which leads them to have negative, even defensive, emotion. Unlike People's Command, Hope Republic operated a mock National Assembly with the participants enrolled in conservative, moderate, and liberal parties, which allowed them to realize the political environment that they pursue. This idealized environment might have led them to share positive emotion.

Moreover, as predicted by the affective intelligence theory (Marcus et al., 2011), emotional reactions were likely to be associated with the selective exposure to congenial opinions. In both groups, anger was expressed more than anxiety among negative emotions. As reviewed in the literature (MacKuen et al., 2010; Marcus & MacKuen, 1993), anxiety encourages people to seek more information, even contrary to their own opinions, whereas anger limits their search to information that reinforces their original viewpoints or even deters searching itself. The prevalence of anger over anxiety seems to be intertwined with the inclination in the sources of information, heavily referring to like-minded others' messages and civic groups.

Lastly, this study compared emotional to cognitive components contained in messages, which rarely has been addressed in the previous research on political communication. The result suggests that cognitive components provided better explanation for the spread of messages than emotional components. In particular, messages that conveyed conviction were more influential than those that conveyed

causation, limitation, or expectation. This result resonates with Huffaker (2010) who found assertiveness to be a significant predictor of triggering replies, creating conversation, and diffusing languages. Among emotional components, messages with anger were more influential than those with anxiety. These imply that assertive and strong claims had greater repercussions in online public fora than analytical, deliberative, and positive remarks, which might be another indication of partisan-oriented discourse.

In sum, the present study contributes to the literature by empirically confirming the presence of the two-step flow of communication in online public fora and testing the difference between the flow of information and the flow of influence, both of which have been under-examined in previous studies. In addition, this study broadens the realm of research on political communication by exploring not only sources and ideological perspectives but also emotional and cognitive aspects in discussions.

Methodological Implications

Currently, many studies in diverse disciplines explore the large-scale data, so-called "big data," which is obtainable through search engines and SNSs. This big-data frenzy has been criticized as being potentially meaningless and valueless without the consideration of context (boyd & Crawford, 2011). In agreement with this criticism, the present study examined not only the network structure but also the context by investigating the content itself.

While most political communication studies used surveys that rely on respondents' memories of content shared or contact with others, this study was based on actual discourse appeared in discussions. With actual discourse, it was able to examine the selective exposure phenomenon as well as emotional and cognitive components embedded in the discourse. This approach of using actual discourse freed the research from the self-report bias that stems from asking survey respondents to go through cognitive processing to define their own emotional or cognitive states.

In addition to the combination of network analysis and content analysis, a multi-level approach was adopted for network analysis and a mixed-method approach for content analysis. The flow of information was explored at macro, meso, and micro levels of analysis, which allowed this study to explore the discussion network in depth from the overall structure to dyadic relationships and then to individuals. In regards to content analysis, not only a quantitative approach but also a qualitative approach visualized the semantic clusters of actual content as well as categorized and quantified the content.

While previous studies on political communication mostly relied on one approach — surveys, ethnographic approaches, content analyses, or panel studies, diverse methods were employed here to complement each other; structure/context, multi-level, and quantitative/qualitative analyses add depth to a single method or level of analysis. Given that there is no perfect method, this study, through a triangulation approach, was able to supplement weaknesses of each method and have an integrated account of online public fora.

Practical Implications

The interaction between participants of People's Command and Hope Republic and the e-government outlet did not take place even though the technology facilitates this interaction. It can be interpreted that people have low confidence in the government's responsiveness to their requests. Valenzuela et al. (2012) found that SNSs use was closely related with political participation, whether or not SNSs users expected governmental changes. Participants of the two groups here might not have expected to interact with the public authorities, but might have valued the Twitter-verse as a place for interaction with fellow citizens.

The negligible communication between @bluehousekorea and ordinary citizens might also result from the government's use of Twitter as a tool for information transmission rather than for interaction, as noted in Wigand (2000). It seemed that the interaction between public authorities and private citizens was not activated in the Twitter-verse, in spite of the recent news report on the government's prompt response to civil requests sent to its Twitter account (Paek, 2012).Chadwick (2003) envisioned that e-government can provide citizens an opportunity to directly influence policy-making decisions, but this was not evident in the present study. Despite the decline of temporal and physical distance via the Internet, the end of distance between public authorities and private citizens has yet to come.

Layne and Lee (2001) proposed four stages of e-government development: First, cataloguing downloadable information; second, providing electronic transactions of services and forms; third, vertically integrating low to high-level government systems;

and fourth, horizontally integrating systems across different functions for citizens' one-stop shopping. These stages are mostly focused on improving transparency and reliability of government procedures and enhancing citizens' *convenience* by facilitating online transactions. It is time to consider increasing interactivity with citizens as the fifth stage of e-government development, which was found to be the most critical factor in people's overall e-government satisfaction in the survey results of Welch et al. (2005).

LIMITATIONS AND SUGGESTIONS

As is often the case with network analysis, this study has the limitation intrinsic to generalizing the results of two cases. However, it examined the dynamics of discussion networks and attempted to find commonalities of those two, enhancing generalizability within certain bounds. Second, the automated analysis of the forms of content might have increased accuracy and reduced possible bias from coders, but it could be possible to miscode some words that had connotations different from their general meanings. Lastly, this study did not confirm whether its findings were unique to political discussion groups, since it lacked a reference case that was not centered on political discussions. This limitation can also be a suggestion for future research to explore discussion networks of groups with diverse topics and to find the unique characteristics of groups for political discussion — i.e. whether patterns are different in other types of groups.

In addition, attribute information of each participant can enrich the current analysis by addressing questions such as how one's political knowledge or interest are

related to the source/ideology/form of content that one authors. As well, the impact of online opinion leaders and the effect of source/ideology/form of content in online political discussions on the formation of public opinions call for more studies. A longitudinal analysis on the change of the discussion network can examine how the opinion leadership changes and how the emotional tone of discussions develops over time. Furthermore, the present study defined opinion leadership based on the flow of information in order to follow the conception of the two-step flow of communication model, but a composite measure of both the flow of information and the flow of influence can contribute to identifying opinion leaders, which might better capture the reality. Lastly, further research needs to be done on the interactivity of e-government beyond its transparency and transaction on which most e-government research has focused.

CONCLUSION

Political discussions in social media appear not to be based on many-to-many interaction, but led by a few individuals whom we can define as opinion leaders, accounting for a large portion of discussions and exerting social influence on others. It seemed that the flow of information is more centralized on a few individuals than the flow of influence. This result implies that people tend to exchange information with whom they commonly regard as information sources and that influence stems from not the reliability of an individual but that of a message. Both information and influence networks were not significantly cliquish, compared to random networks. Political

discussions were more emotional and partisan-oriented with anger and conviction embedded, rather than deliberative and rational. Assertive discourses were more influential. People relied on like-minded opinions of fellow citizens, not on the media.

This representation of online political discussion is far from the traditional form of the public sphere defined by Habermas, but depicts the characteristics of the networked public sphere. By sharing ideas, validating each other's thoughts, and spreading opinions, people are engaged in the process of forming public opinions, although this process does not yet include the involvement of the government. The emotional, provocative claims and audiovisual cues shared in online political discussions can draw attention to politics. Especially, social media that facilitate civic interaction and engage large number of people have a potential to enhance the general public's interest in politics. The positive effect of social media on voter turn-out rates found in a recent study (Bond et al., 2012) suggests how political discussions in social media can reduce political apathy which has been a major problem in many democratic societies.

Although deliberative discussions based on diverse ideological perspectives and sources of information are not common in political discussions in social media, it does not necessarily mean that the latter has no democratic value. Social media can function as networked public spheres where public opinions are formed and as one of indicators of public opinions, complementing the limitation of the mass-media-based public sphere and national polls.

Appendices

Appendix 1: Coding scheme for content analysis

Sources of content (Hyperlinks)

1. User-generated content
    - User-generated content is sub-classified into the following categories based on objects toward which hyperlinks direct. For instance, if hyperlinks connect to SNSs, the source of content is coded as 13. SNSs, even though SNSs include both video clips and images.
    11. Video clips
        - hyperlinks directed toward video clips
    12. Images
        - hyperlinks directed toward images
    13. SNSs (texts)
        - hyperlinks directed toward SNSs
2. Traditional media
    - Hyperlinks connecting with traditional media websites such as television, newspaper, magazine, and radio news sites.
3. Net-based media
    - Hyperlinks linking to net-based news sites such as online grassroots media (e.g. ohmynews.com) and online newspaper sites (e.g. pressian.com).
4. Government
    - Hyperlinks leading to homepages, blogs, and SNSs of the government, government officials, or government organizations such as Ministries and agencies.
5. Civic groups
6. Others
    - Hyperlinks connecting to websites not pertinent to the above categories.
    - Broken hyperlinks.

Ideological perspectives of content (Tweet messages)

1. Inter-ideological
    - Opinions not leaning towards liberal, progressive viewpoints
    - Conservative, pro-government opinions or moderate opinions
2. Intra-ideological
    - Liberal, progressive opinions
    - Sometimes, anti-government, anti-conglomerates
3. Non-ideological or personal
    - Anything not classified into 1 and 2
    - For instance, remarks opinionated but not ideological, facts, announcement, and personal issues not pertinent to group discussions

Appendix 2.1: Degree centrality and flow betweenness of People's Command

ID	Degree	Flow Betweenness
actormoon	16.7%	20.0%
minorunit	8.8%	11.8%
sarangbi	8.6%	21.0%
millionocracy	6.1%	16.9%
lkjae	4.9%	7.7%
2sind2	4.9%	2.3%
61510410	3.4%	0.9%
hopeliberty	2.0%	0.1%
kgh38	1.7%	0.0%
misslee1004	1.7%	0.0%
h_chief	1.5%	0.3%
MBOUTos21c	1.5%	5.1%
arco_kwon	1.2%	0.0%
fool2000	1.2%	3.5%
gumdol2	1.0%	0.8%
MINDAEKAI	1.0%	0.4%
sandol2000	1.0%	0.4%
yijongseo	1.0%	0.4%
ggummoa	0.7%	0.0%
high5cha	0.7%	0.0%
iris2012v	0.7%	0.2%
jude_Lee1978	0.7%	0.1%
kmlee36	0.7%	0.0%
luralatoo	0.7%	0.1%
mhj412	0.7%	0.0%
o98765	0.7%	0.1%
oLzLssl	0.7%	0.1%
ssunkim	0.7%	0.2%
SunMoon_Jo	0.7%	1.7%
tjkweon	0.7%	0.3%
yangyoungki	0.7%	1.4%
ygellies	0.7%	0.3%
actwalk	0.5%	0.0%
aegis80	0.5%	0.0%
ahncw	0.5%	0.0%
airbus86	0.5%	0.0%
alozen21	0.5%	0.0%
baltong3	0.5%	0.2%
ChaplinHead	0.5%	0.1%
doosoooo	0.5%	0.7%
flytosky7	0.5%	0.0%
Gec8nom	0.5%	0.0%
girlonthesn	0.5%	0.0%
hasungyun	0.5%	0.0%
hdg124	0.5%	0.0%
hnkim_	0.5%	0.0%
innokor	0.5%	0.0%
iyoyang	0.5%	0.0%
JNJ729	0.5%	0.0%
kanggigap	0.5%	0.2%
keb_angel	0.5%	0.0%
kite6gi	0.5%	0.0%
kmlee21	0.5%	0.0%
kyunwoo7	0.5%	0.0%
oikoss	0.5%	0.0%
onegerm	0.5%	0.0%
pharm1001	0.5%	0.7%
PopeBByc	0.5%	0.0%
pyk1951	0.5%	0.0%
siminnmh	0.5%	0.0%
sody1003	0.5%	0.0%
sungsik022	0.5%	0.0%
ToughMar	0.5%	0.0%
tovagi717	0.5%	0.0%
violetwd	0.5%	0.0%
yhsgmo	0.5%	0.0%
yoku7474	0.5%	0.0%
yoon15380	0.5%	1.7%
bangyc	0.2%	0.0%
citizen_kr	0.2%	0.0%
cliffree	0.2%	0.0%
coconnnnu	0.2%	0.0%
coreacom	0.2%	0.0%
dlteresa	0.2%	0.0%
expert0001	0.2%	0.0%
goodgeori	0.2%	0.0%
jb_1000	0.2%	0.0%
jjwinss	0.2%	0.0%
kjc8484	0.2%	0.0%
kortech1	0.2%	0.0%
news2heal	0.2%	0.0%
sin4clover	0.2%	0.0%
skyubis	0.2%	0.0%
youtube	0.2%	0.0%
bonitamh	0.0%	0.0%
chiwoo82	0.0%	0.0%
coreacyc	0.0%	0.0%
gamediller	0.0%	0.0%
jjamjang00	0.0%	0.0%
kangyulee	0.0%	0.0%
nawanggu	0.0%	0.0%
polkorea	0.0%	0.0%
saerom07	0.0%	0.0%
stefano_ba	0.0%	0.0%
taesub76	0.0%	0.0%
vinnie0427	0.0%	0.0%
Total	100.0%	100.0%

Appendix 2.2: Degree centrality and flow betweenness of Hope Republic

ID	Degree	Flow Betweenness
blu62	17.8%	25.9%
h_chief	8.7%	12.2%
sigolsonye	5.8%	9.3%
chposthy	4.7%	14.8%
daesabu	4.0%	7.8%
dltnsdud60	4.0%	3.0%
lskjss	3.1%	0.1%
jmbrt	2.9%	1.2%
romeo0102	2.4%	3.6%
parkchungrim	2.0%	6.4%
kimseriiii	1.6%	0.2%
ntiskang	1.3%	2.2%
cherryda	1.1%	3.5%
happygreen1	1.1%	0.0%
twtroom	1.1%	0.0%
HummyMom	0.9%	1.1%
kimYouMi26	0.9%	0.7%
rosario6970	0.9%	0.0%
songjeonghwan	0.9%	0.0%
yhsgmo	0.9%	0.1%
YOUNGHWANJO	0.9%	1.1%
aang123	0.7%	1.2%
aixwangja	0.7%	0.1%
asa84645886	0.7%	0.2%
intpit	0.7%	0.0%
issuenow	0.7%	0.0%
leiro10	0.7%	0.0%
think_guy	0.7%	0.0%
yuhs56	0.7%	0.0%
3chon_	0.4%	0.2%
bbcnn7	0.4%	0.0%
caota	0.4%	0.0%
ckp6737	0.4%	0.0%
DASAN707	0.4%	0.0%
dicadong	0.4%	0.0%
DLPKorea	0.4%	0.2%
ecokimom	0.4%	0.0%
ella_2	0.4%	0.0%
hanooldad	0.4%	1.1%
happyonnuri	0.4%	0.2%
I_candoit_every	0.4%	0.2%
ichwell	0.4%	0.7%
illustrator_hsj	0.4%	0.0%
jhsbridge	0.4%	0.2%
jisakn	0.4%	1.1%
jjb630	0.4%	0.0%
jkmings	0.4%	0.0%
kgd8874	0.4%	0.0%
kim3moon1	0.4%	0.0%
kkiyop	0.4%	0.0%
ksc00013	0.4%	0.2%
minshappy	0.4%	0.0%
pyb0415	0.4%	0.0%
rockminater	0.4%	0.0%
soohonea	0.4%	0.2%
TemuKR	0.4%	0.2%
1004_island	0.2%	0.0%
2sind2	0.2%	0.0%
56msk	0.2%	0.0%
5naji	0.2%	0.0%
achimgirin	0.2%	0.0%
AeHee92	0.2%	0.0%
akaqlc	0.2%	0.0%
alcolberryfinn	0.2%	0.0%
assa76	0.2%	0.0%
Avalanche__	0.2%	0.0%
barbadak30	0.2%	0.0%
but211	0.2%	0.0%
ccssjj1215	0.2%	0.0%
champmjm	0.2%	0.0%
choonsig	0.2%	0.0%
cir3939	0.2%	0.0%
cjpark90	0.2%	0.0%
coconomics	0.2%	0.0%
coreacys	0.2%	0.0%
dksd1011	0.2%	0.0%
elelohemh	0.2%	0.0%
FluteEunaPark	0.2%	0.0%
FreeFairJustice	0.2%	0.0%
gongspappy	0.2%	0.0%

ID	Degree	Flow Betweenness
goodtaese	0.2%	0.0%
GREENGOMS	0.2%	0.0%
h_cheif	0.2%	0.0%
Haram012	0.2%	0.0%
HealthyRyu	0.2%	0.0%
hoon111877	0.2%	0.0%
ic2014	0.2%	0.0%
jaegalhyun	0.2%	0.0%
JaeyounRyoo	0.2%	0.0%
JKhyeong	0.2%	0.0%
jmb	0.2%	0.0%
jongdae_park	0.2%	0.0%
jupia00	0.2%	0.0%
juswmis	0.2%	0.0%
k51510	0.2%	0.0%
kangyulee	0.2%	0.0%
koreain	0.2%	0.0%
kortech1	0.2%	0.0%
linktraveler	0.2%	0.0%
LouiseKarl	0.2%	0.0%
Marceloson	0.2%	0.0%
mkchai07	0.2%	0.0%
morningstartou	0.2%	0.0%
mroption	0.2%	0.0%
napolywoo	0.2%	0.0%
nirvana_go	0.2%	0.0%
phoebus_lee	0.2%	0.0%
postcs	0.2%	0.0%
Ra843	0.2%	0.0%
riverskykim	0.2%	0.0%
S_D_HONG	0.2%	0.0%
sangawon	0.2%	0.0%
shinmy7210	0.2%	0.0%
siverrain6	0.2%	0.0%
snowbel73	0.2%	0.0%
soobong63	0.2%	0.0%
Temukr	0.2%	0.0%
tkm0640	0.2%	0.0%
togater	0.2%	0.0%
tonf1018	0.2%	0.0%
TWTROOM	0.2%	0.0%
UNIFYCOREA	0.2%	0.0%
withnabi	0.2%	0.0%
yan1225	0.2%	0.0%
yokstar	0.2%	0.0%
yonchon1	0.2%	0.0%
younghwanjo	0.2%	0.0%
bkhong01	0.0%	0.0%
coupon365	0.0%	0.0%
ejwkr	0.0%	0.0%
expert0001	0.0%	0.0%
hildegardis0917	0.0%	0.0%
issuetoday	0.0%	0.0%
kclee21	0.0%	0.0%
koreayachtman7	0.0%	0.0%
max0509so	0.0%	0.0%
mglxlpse	0.0%	0.0%
neoace33	0.0%	0.0%
osori55	0.0%	0.0%
polkorea	0.0%	0.0%
psm7676	0.0%	0.0%
Remonade1001	0.0%	0.0%
stylesean	0.0%	0.0%
The_coffee_haus	0.0%	0.0%
TravelSketch	0.0%	0.0%
travelsketch	0.0%	0.0%
Yongtae1	0.0%	0.0%
Total	100.0%	100.0%

Appendix 3.1: Goodness of fit results for PNet model of People's Command

	Mention network		Retweet network	
Parameters	SE	t-ratio	SE	t-ratio
reciprocity	**4.45**	**-0.04**	**0.98**	**0.01**
2-in-star	**568.86**	**-0.05**	**122.97**	**-0.05**
2-out-star	**46.26**	**0.03**	**8.20**	**-0.02**
3-in-star	**10473.46**	**-0.04**	**1387.98**	**-0.04**
3-out-star	**147.69**	**0.03**	**9.05**	**-0.03**
path2	127.58	-0.31	50.73	-0.02
T1	2.40	-0.39	0.14	-0.13
T2	17.19	-0.50	1.06	-0.25
T3	21.35	-0.56	1.63	-0.45
T4	16.69	-1.30	2.91	-0.16
T5	11.25	-0.45	1.03	-0.42
T6	18.78	-0.35	0.98	-0.40
T7	101.29	-1.17	34.11	-0.54
T8	59.93	0.07	4.56	-0.02
T9(030T)	30.39	-0.31	7.07	-0.12
T10(030C)	9.12	-0.59	1.01	-0.66
Sink	**3.98**	**0.04**	**2.08**	**0.03**
Source	**6.47**	**-0.02**	**3.87**	**0.03**
Isolates	3.08	0.54	3.39	-0.03
AinS	**15.12**	**-0.05**	**7.44**	**-0.03**
AoutS	**12.79**	**0.02**	**5.05**	**-0.02**
AinS	15.12	-0.05	7.44	-0.03
AoutS	12.79	0.02	5.05	-0.02
Ain1out-star	24.17	0.19	6.16	1.42
1inAout-star	23.76	-1.25	20.72	-0.39
AinAout-star	7.66	-0.07	3.55	0.67
AT-T	**20.96**	**-0.08**	**6.09**	**-0.04**

	Mention network		Retweet network	
Parameters	SE	t-ratio	SE	t-ratio
AT-C	16.67	-0.63	2.76	-0.69
AT-D	14.47	0.47	3.77	0.12
AT-U	22.10	-0.02	5.86	-0.02
AT-TD	13.78	0.18	4.82	0.02
AT-TU	21.46	-0.05	5.95	-0.03
AT-DU	13.89	0.23	4.69	0.03
AT-TDU	15.76	0.10	5.13	0.01
A2P-T	**107.44**	**-0.07**	**49.26**	**-0.04**
A2P-D	43.74	0.16	6.68	0.14
A2P-U	499.47	-0.06	121.67	-0.03
A2P-TD	69.12	0.00	25.66	-0.02
A2P-TU	224.63	-0.08	69.36	-0.04
A2P-DU	231.33	-0.04	59.18	-0.02
A2P-TDU	138.27	-0.07	45.47	-0.04
Std Dev in-degree dist	1.05	0.04	0.35	0.00
Skew in-degree dist	0.81	0.68	0.51	0.28
Std Dev out-degree dist	0.30	0.13	0.11	0.04
Skew out-degree dist	0.77	0.75	0.53	0.28
CorrCoef in-out-degree dists	0.17	-0.37	0.17	0.02
Global Clustering Cto	0.13	-0.42	0.11	-0.15
Global Clustering Cti	0.02	-0.33	0.01	-0.12
Global Clustering Ctm	0.08	-0.11	0.05	-0.21
Global Clustering Ccm	0.04	-0.72	0.02	-0.74
Global Clustering AKC-T	0.08	-0.17	0.04	-0.10
Global Clustering AKC-D	0.05	0.10	0.09	-0.09
Global Clustering AKC-U	0.01	-0.20	0.01	-0.04
Global Clustering AKC-C	0.03	-0.82	0.02	-0.75

Note: Parameters in bold were included in the model.

Appendix 3.2: Goodness of fit results for PNet model of Hope Republic

	Mention network		Retweet network	
Parameters	SE	t-ratio	SE	t-ratio
reciprocity	**3.93**	**0.00**	**2.27**	**-0.07**
2-in-star	**341.18**	**0.01**	**140.42**	**0.03**
2-out-star	**114.55**	**0.00**	**22.26**	**-0.04**
3-in-star	**5077.82**	**0.01**	**1826.28**	**0.04**
3-out-star	**603.71**	**0.00**	**66.09**	**-0.03**
path2	187.14	-0.08	74.86	-0.12
T1	4.16	-1.08	1.40	-0.83
T2	27.20	-0.76	9.11	-0.59
T3	30.70	-0.47	10.34	-0.38
T4	14.24	-0.45	5.67	-0.08
T5	18.90	-0.61	5.86	-0.59
T6	28.36	0.51	8.41	0.18
T7	170.98	0.21	59.38	0.30
T8	90.87	-0.04	27.72	0.16
T9(030T)	37.53	-0.09	13.70	-0.20
T10(030C)	11.96	-0.25	4.13	-0.24
Sink	**6.91**	**0.04**	**3.67**	**-0.05**
Source	**7.12**	**-0.05**	**5.13**	**0.03**
Isolates	4.58	-0.52	4.92	-0.14
AinS	15.02	-0.03	**8.36**	**0.05**
AoutS	20.40	0.03	**8.29**	**-0.04**
AinS	15.02	-0.03	8.36	0.05
AoutS	20.40	0.03	8.29	-0.04
Ain1out-star	31.35	0.51	11.69	1.04
1inAout-star	25.52	0.22	14.97	0.67
AinAout-star	5.36	0.74	3.98	1.69
AT-T	**17.81**	**-0.01**	**9.53**	**-0.06**

	Mention network		Retweet network	
Parameters	SE	t-ratio	SE	t-ratio
AT-C	17.93	-0.03	8.48	-0.09
AT-D	20.59	0.12	8.71	0.03
AT-U	14.27	0.61	8.40	0.15
AT-TD	18.80	0.06	9.02	-0.02
AT-TU	15.47	0.27	8.89	0.04
AT-DU	15.99	0.35	8.37	0.09
AT-TDU	16.50	0.22	8.72	0.04
A2P-T	**187.46**	**0.02**	**72.99**	**-0.02**
A2P-D	98.53	0.16	19.47	0.21
A2P-U	342.32	0.05	141.44	0.07
A2P-TD	79.02	0.12	39.30	0.03
A2P-TU	253.77	0.04	100.08	0.04
A2P-DU	133.58	0.13	67.13	0.10
A2P-TDU	146.03	0.09	65.46	0.06
Std Dev in-degree dist	0.66	0.10	0.33	0.09
Skew in-degree dist	1.22	0.65	0.94	0.43
Std Dev out-degree dist	0.30	0.06	0.11	0.00
Skew out-degree dist	0.46	-0.07	0.45	0.09
CorrCoef in-out-degree dists	0.09	-0.40	0.08	-0.28
Global Clustering Cto	0.03	-0.13	0.04	-0.19
Global Clustering Cti	0.05	-0.31	0.02	-0.28
Global Clustering Ctm	0.04	-0.11	0.03	-0.18
Global Clustering Ccm	0.03	-0.25	0.02	-0.22
Global Clustering AKC-T	0.02	-0.13	0.02	-0.08
Global Clustering AKC-D	0.02	0.00	0.03	-0.07
Global Clustering AKC-U	0.02	-0.14	0.01	-0.07
Global Clustering AKC-C	0.02	-0.11	0.02	-0.09

Note: Parameters in bold were included in the model.

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